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HANDBOOK TO HULL
AND THE
EAST RIDING OF YORKSHIRE

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HANDBOOK TO HULL AND THE EAST RIDING OF YORKSHIRE

PREPARED FOR THE MEMBERS OF
THE BRITISH ASSOCIATION FOR
THE ADVANCEMENT OF SCIENCE
ON THE OCCASION OF THEIR VISIT
TO HULL IN SEPTEMBER, 1922

EDITED BY

T. SHEPPARD, M.Sc., F.G.S.
Hon. Local Secretary

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PREFACE

IN the following pages an effort is made to draw attention to the various attractions of Hull and the East Riding likely to appeal to the members of the British Association. As one who has attended the meetings of the Association for many years (he hopes, as an average member), the editor has done his best to produce a handbook likely to be of service to the visitors during their brief and busy visit. Some of the following pages contain new matter, others contain summaries of memoirs and papers already published. Technicalities, as far as possible, have been avoided, as the experts in the different sections will be familiar with the special books and volumes relating to their subjects, in the area.

The editor commenced this volume with the buoyant hope that he would have had the assistance of a whole army of specialists in its preparation. To a certain extent, as the chapters show, he has been successful; but so many to whom he applied were either "too busy," or had other reasons for declining to assist, that much more than his share has fallen upon the editor; these chapters are not signed. The notes on "The Old Hull Grammar School" are written by Mr. T. Tindall Wildridge. As one of the local secretaries (and, incidentally, curator of Hull's

museums), his "spare time" recently has been occupied in other things besides preparing this volume, which is perhaps not so strictly scientific as some might consider desirable; for example, the chapter on Geology is not necessarily for the expert geologist, who knows, or should know, of special volumes dealing with the Riding.

In conclusion, I am particularly indebted to the Chairman, Councillor Pybus, and members of the Handbook Sub-Committee for giving me so free a hand.

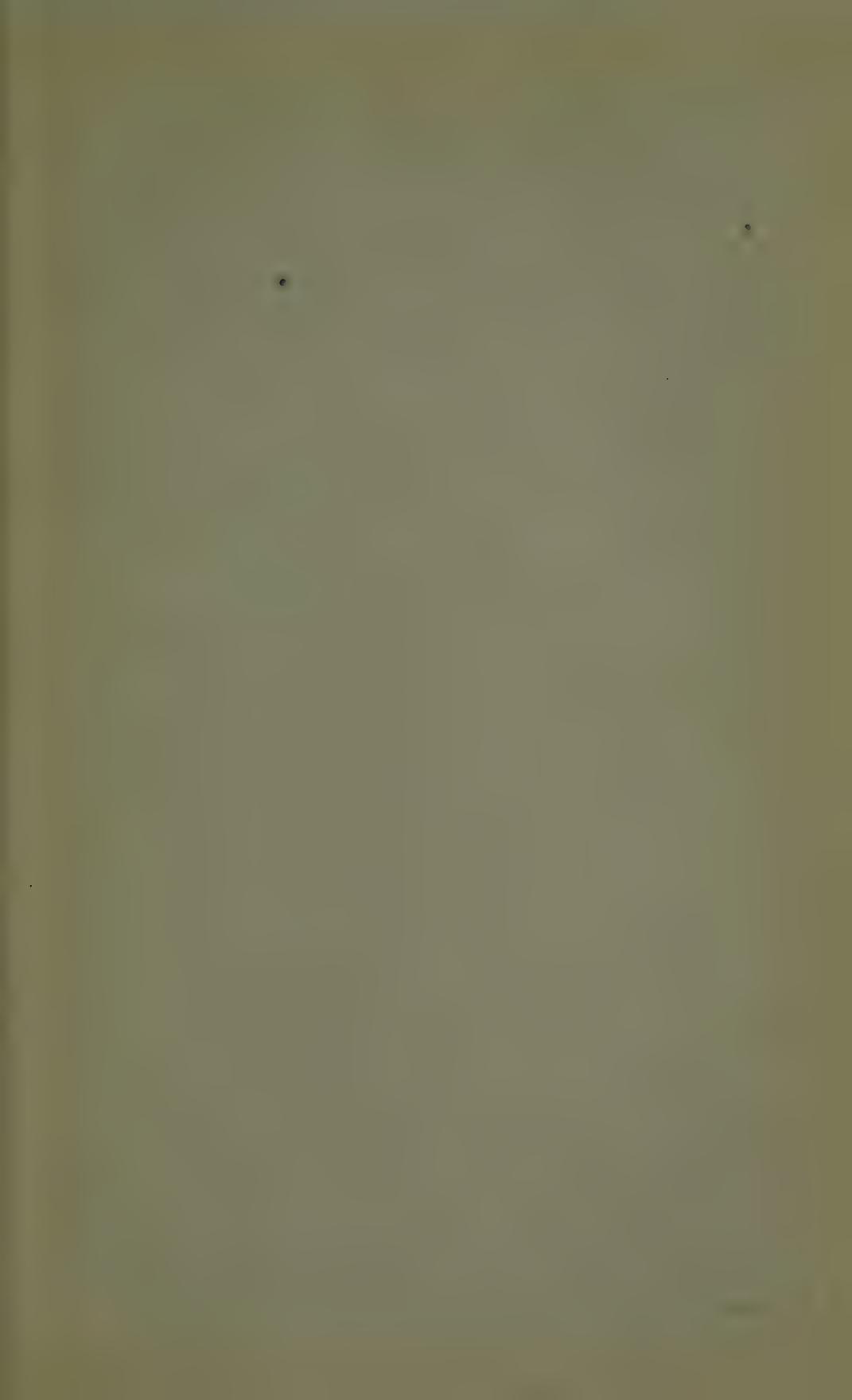
T. SHEPPARD.

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THE ALEXANDRA DOCK, HULL, DURING THE WAR.

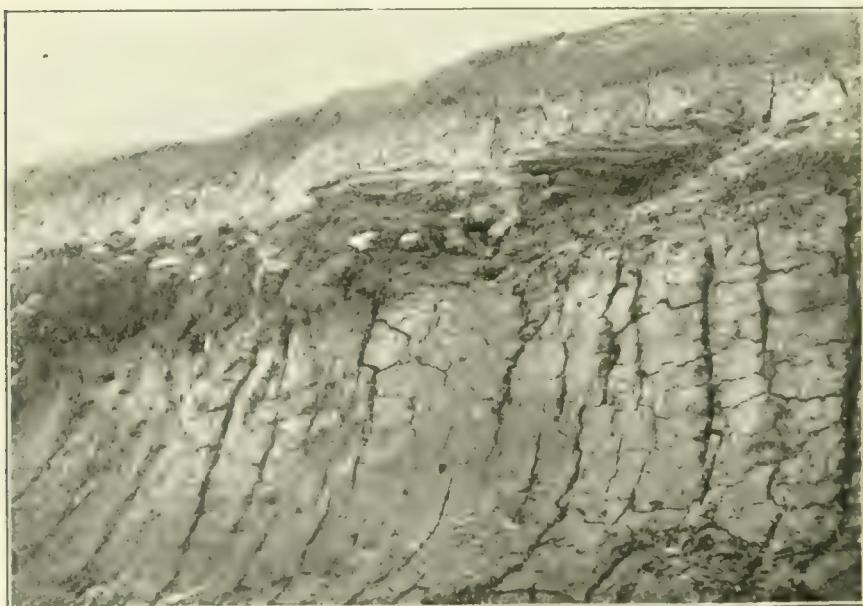
THE EVOLUTION AND GROWTH OF HULL

AT the time when what are now the British Isles were first occupied by human beings, the North Sea washed a line of cliffs stretching from Hessle, through Beverley and Driffield, to Bridlington. The Humber, a mighty river even then, ran straight out to the sea, its mouth being where Withernsea now stands. Later, during the Great Ice Age, the melting ice left behind irregular masses of glacial drift—clay with pebbles—which form the foundations of our city. As the climate gradually became warmer, vegetation flourished, and the Scotch fir, oak, hazel, birch, and other trees grew upon the glacial material which remained above the water. Time passed, and these forests, with their occupants—the wild boar, beaver, bison, wolf, and red deer—disappeared. The trees fell, and the great growth of timber became the bed of peat which still lies under Hull, twenty-five feet down. So far, however, man had not appeared upon this scene.

After the Forest-bed period, the waters of the Humber estuary washed over a large part of the area of Holderness, including the site upon which Hull is built. Beneath the city is a thick bed of fine silt, once deposited by these waters, and no doubt several hundred years were occupied in its accumulation. This silt was laid down year after year, until in time only the highest tides were able to cover the mud-flats

which then extended along a great depression which is now the valley of the River Hull. These mud-flats were, in time, embanked, possibly by the early Saxon settlers, and the area became habitable.

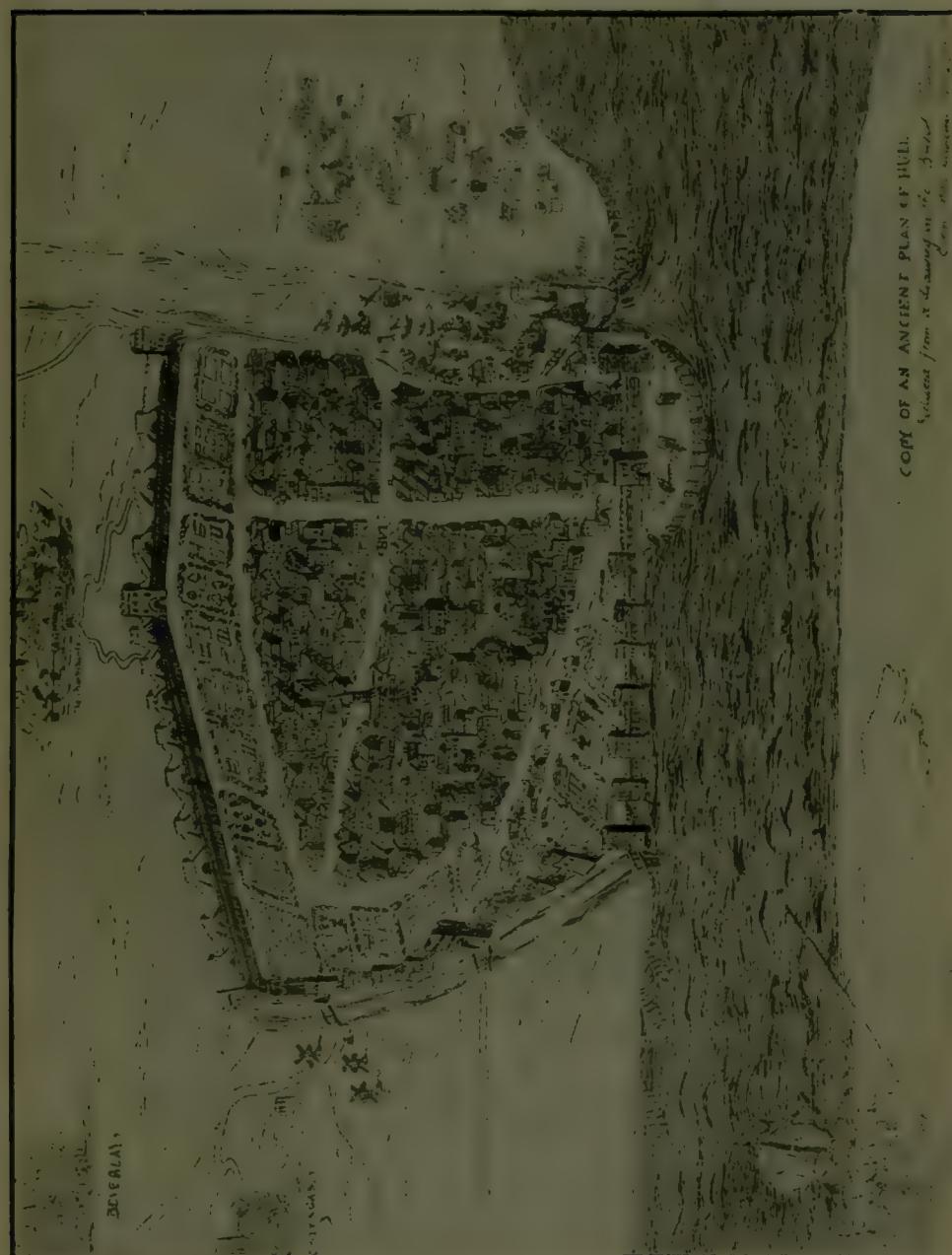
The first occupants of this area came from the Baltic, possibly from Norway, Sweden and Denmark. These people selected a corner of land at the junction



THE DRIED-UP BED OF AN ANCIENT MERE IN THE
CLIFFS AT SKIPSEA.

of the River Hull and the Humber; probably in those days it was an island, a delta between two mouths of the River Hull, as a second mouth existed west of the present one. To this settlement merely a small village the name Wyke was given, for the simple reason that the place was built on the side of the Wyke, or Vik, the old Norse word for Creek, in the same way that to-day the City is called "Hull," because

SEVERAL



COPY OF AN ANCIENT PLAN OF HULL.

A drawing from a drawing in the
British Museum.

it is on the banks of the river of that name. So the first name "Wyke" held good for the place until the reign of King Edward I., when that monarch obtained it from the Monks of Meaux, a monastery which once existed near Beverley. This was in the year 1299, from which date the correct name has been Kingston-upon-Hull. Naturally, under the patronage of the King of England, this Kingston grew and flourished, and its boundaries had to be extended from time to time.

By the aid of the numerous plans which exist, it is possible to form some idea of the growth and evolution of the city. When, by means of banks, the River Hull was confined to a definite channel, the first buildings to be erected would be along the bank side. The growth of the place as a port meant the extension of buildings along the river and estuary, and the land occupied by warehouses and dwellings would extend northward and westward. Then, as now, the River Hull was a harbour for loading and unloading merchandise, and its banks would be lined with wharves and warehouses and offices. No doubt early Hull was just a thin red line of brick buildings, in the same way as some of the villages in the district—villages of Danish origin still are; a single street with a row of houses on each side.

Thus the first street would be parallel with the River Hull, in order to give access to the buildings along its banks. In this way the Hull Street, as it was formerly called (now High Street), came to be; and High Street is our oldest thoroughfare. The way in which it meanders, exactly as the river does, proves its great age. As time went on, the merchants built their houses facing High Street, with gardens or

stores on the river's edge. Later, the opposite or western side of High Street would be occupied, and to give access to these buildings a road of less im-



ENGRAVING OF SIR JOHN HOTHAM.

With view of Hull in the background, 1642.

portance, the low road or Low Street (now Lowgate) was made, and to connect these two roads were the narrow lanes, Bishop Lane, Chapel Lane, Scale Lane, and others, most of which to-day are not wide enough for carts to pass in them.

The growth of the port would result in the means of communication with the neighbouring villages of Hessle, Anlaby, Beverley, Sutton, and beyond, being opened out. These main roads were connected by smaller streets or lanes ; in this way the plan of Hull became like a spider's web, though slight irregularities arose from the lanes leading to the old religious houses and the river's mouth. It must be remembered, however, that in those early days there were "land thieves and water thieves," and private property was not then so well protected as now. Communication with the country outside, before good roads, railways, motor cars, telephones and the telegraph were known, enabled night raids readily to be made upon the port, either from the land or from the Humber. These became so frequent that it became necessary to erect a high wall and dig a moat round the town for protection. This was first built early in the fourteenth century, but was improved and strengthened on many subsequent occasions. The wall extended from what is now North Bridge to Monument Bridge and thence to the Minerva Pier, the existing town docks practically occupying the site of the moat or ditch which surrounded the wall. When first built, this wall enclosed fields, gardens and open spaces, as well as all the houses and other buildings. By the middle of the seventeenth century, as shown by Hollar's plan of Hull (1640), there was much land within the walls not built upon, and even a century and a half ago, what is now "the old town," that is, the town within the docks, was practically the extent and area of Kingston upon Hull. On a modern plan of Hull this old town looks like a small heart in a great body, and like a heart, it still controls the rest of the city.

No doubt the protection given to the town in the reign of Edward II. principally depended for its strength upon the earthworks and surrounding ditches, the former of which eventually became the foundations of the extraordinary wall, with its numerous towers,



HARGREAVE'S PLAN OF HULL IN 1791.

It shows a plan of the first Dock constructed in Hull, and of the Old Citadel.

its gates, moat and drawbridges, which are so well represented by the Dutch engraver in 1640.

In addition to growing towards the east, north and west, Hull has extended in a southerly direction. "Humber Street," and "Sand South End," once formed the old Humber shore, and are now some distance within the city. Hull's entire present frontage has been built into the river.

HULL'S PAST HISTORY

AS already explained, the History of Hull is one of uninterrupted progress from the time it was obtained from the Monks of Meaux in 1299.

As Kingston-upon-Hull was under Royal Patronage, the De-la-Poles and other wealthy merchants flourished ; a Royal Charter was given to the town, entitling the Burgesses or Freemen of the Borough to certain rights and privileges in the way of tolls and fairs, and in other respects. These rights were confirmed in subsequent years by later kings and queens of England, some of whom granted still further privileges ; our most recent Charter entitling the City to have a Lord Mayor. These various Charters are preserved at the Guildhall.

At all times every effort was made to encourage trade, and ships were chartered to convey merchandise between Hull and various parts of the world, principally to the nearer Continental ports. The numerous waterways connected with the Humber enabled the goods to be conveyed to various inland towns by means of smaller craft, and consequently warehouses and wharves were erected to deal with this enormous volume of traffic, which was principally dealt with on the banks of the River Hull, or "Old Harbour."

As years went on, the number of ships increased to such an extent that about two centuries ago it frequently happened that some of the vessels in the upper part of the harbour were so crowded that other

boats lower down left Hull, proceeded to some foreign country, unloaded their cargoes, loaded up again with some foreign produce, and returned to Hull before the vessels in the higher part of the harbour were liberated. It was largely in consequence of this state of affairs that about 160 years ago the Government handed over to the old Hull Dock Company the land occupied by the moats and fortifications in order to provide additional dock accommodation. Thus it



ARMS OF THE DE-LA-POLE FAMILY.

came about that a line of docks connected the River Hull with the Humber, on a site previously occupied by the wall, and the name "Dock Walls" is still given to part of the land along the dock side. On looking at a plan of Hull, therefore, the relative position and size of the "old town" (being the town within the docks) and the present city, can readily be seen.

This wall, originally erected in some primitive form in the reign of Edward II., and considerably modified and improved by various later monarchs, was strengthened by numerous towers, upon which

the guards would be stationed, and access to the outside world was obtained by means of bridges which were lowered over the moat during the daytime ; one at Northgate, which led towards Holderness ; another at Beverley Gate (where Monument Bridge now is), leading to Beverley ; another at Hessle Gate (where Humber Street now is), leading to Hessle. The bridges, which to-day occupy somewhat similar positions to those of the old ones, give an idea of the former appearance of the town, as when these bridges are up, the "old town" practically becomes an island, surrounded by the Humber, the River Hull, and the three Docks.

This wall was destined to play an important part, not only in the history of this town, but in the history of England. In the year 1639, King Charles I. (after the manner of the earlier King Edward I.) paid a visit, in state, to this town. We learn from the records that on this occasion the Governor and the various town officials were provided with new robes, and they met the King with great pomp and ceremony at Beverley Gate. A fulsome address was read, the keys of the town were handed to the King, as well as a purse of gold. The King and his followers were escorted through the town to High Street (then the principal thoroughfare) to the residence of Sir John Lister, one of the wealthiest of the merchants at that time, who sumptuously entertained the King, and in his house the King slept that night. This house, with the rooms very little altered, and the oak panelling and elaborately carved overmantel, just as King Charles saw it, is still intact, and known to-day as the Wilberforce Museum.

The following is a copy of the remarkable address

which was read to King Charles on his arrival at the Beverley Gate :—

“ Most Gracious Sovereign,

“ If the approaches to the sacred thrones of Heaven and Earth had been by the same way of access, we had long since learned, by our daily praying to the King of Kings, to speak as might become us to your sacred Majesty, whom God has now blessed and honoured us with the presence of. But since these are different, and we are not so much conversant with the latter as with the former, we must heartily crave your sacred pardon and grace for any rudeness which is or may be committed ; assuring your Majesty that it proceeds from nothing but want of knowledge and skill how to receive and express ourselves upon the happy reception of so much glory. Our full hearts make us almost unable to undergo what we most thankfully undertake, and would even stop all passages of speech, and make us dumb with the awful Majesty that happily we behold and adore, could but the greatness of our love, loyalty, and hearty affections to you, be as well seen, understood, and weighed, in silence as in words.

“ We make bold, with the utmost zeal and fidelity that can be, to give your Majesty a full assurance of our most sincere loyalty, and will adhere to you against all your enemies with the utmost of our lives and fortunes.

“ This town was always faithful and true ; and in respect of the zealous and loyal affections of the people of the same, to your Majesty's honour and service, it may be said, as is of the City of

Seville, in Spain, not only to be walled, but also to be garrisoned with fire ; not dead, nor sleeping, not unanimated, like senseless flints, but continually vivacious, waking, ardent, apparent, and sensible, in their courageous and boiling heat for your Majesty's long life, welfare and happiness, so that, as the town is not only yours by name, but also by nature, so shall it ever remain to be.

" Your Majesty has not only here a Magazine of all military provisions of your own royal collecting, ordering, and appointment, but also a richer, a more noble, and safe prize, even a Magazine of hearts, faithful and true, extended the whole town over, which renders it stronger for your Majesty's service than if it was encompassed with walls of brass or iron.

" Your Majesty's most noble predecessors built, encouraged, and honoured it, the pious and good King Edward VI. committed the Castle and Block-houses of it to the perpetual keeping of the Corporation, and it is part of every Mayor's oath, ' them safely to defend and keep to the use of the King, his heirs and successors,' and, as they and we have always been true and loyal, so nothing shall ever make us forget our duties to your Majesty in these respects.

" May your Majesty live for ever and ever ; and may all the thorns in your travels grow up into crowns ; may your battles be always crowned with laurels ; and may good success always attend your actions and desires. May years be added unto your days, and length of time, till time shall be no more ; and that your continuance amongst us may be still an ornament

and blessing to the present age, and an eternal admiration, blessing, and glory, to all that are yet to come."

The irony of this address is shown when three years later, in 1642, King Charles, remembering the



VIEW OF THE OLD SUFFOLK PALACE IN HULL.

It occupied the site of the present Post Office.

kindness shown and the loyalty expressed on his former visit, came to Hull for support during that serious conflict which was waging in this country, the "Civil War." On King Charles mustering his soldiers in the fields outside Hull (fields now occupied by St. John Street, Savile Street and Dock Street), he was greatly offended to find that the Governor, Sir

John Hotham, had raised the bridge and declined to allow the King and his followers to enter the city, explaining from his position at the top of the tower of Beverley Gate, that the people of Hull had sympathies with the Parliamentarians, and therefore were unable to assist the King in his war.

The original document recording this “undutiful affront,” which was issued by the King at the time, is among the treasures relating to this period which are preserved in the Wilberforce Museum.

On receiving Sir John Hotham’s reply, the King arranged his soldiers around the town, bombarded the place with cannon balls of solid iron and stone, and endeavoured to starve the people to submission. The shot, however, did little damage, although in some cases the iron balls were made red-hot before being fired; and his efforts to prevent the supplies of food and water reaching the town were unsuccessful owing to the ready access by means of the Humber and the river. The people of Hull replied by firing from the walls, and had previously taken the precaution of destroying the old Charterhouse and one or two other places then situated outside the walls, so that the King’s soldiers could not take shelter. Finally Charles gave up the siege, and the opposition, instead of the support which he had expected from Hull, had much to do with the termination of the war.

Since then various industries and trades have sprung up in the town; some have considerably extended, some have been modified in accordance with later conditions; others have disappeared altogether.

Soon after the Civil War, for example, there was a very important tobacco pipe industry and pipes

were manufactured in large numbers and distributed all over the country. The workmen had a Gild, and records of the different tobacco pipe makers and,



SEVENTEENTH CENTURY PIPE.

their apprentices, with their various business transactions and grievances, are still preserved. When the new streets, Jameson Street, King Edward Street and others were made, fifteen or sixteen years ago, excavations showed that outside the town's walls had



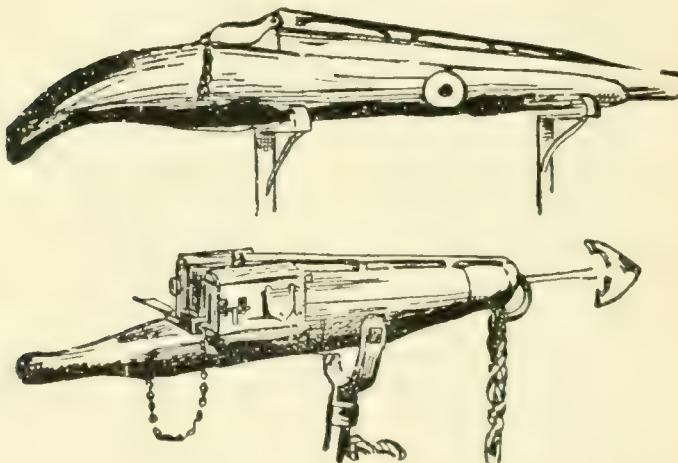
MAKERS' MARKS ON THE HEELS OF PIPES MADE IN HULL.

once been large brickyards which, about 1650, had been filled with the town's rubbish. Among this rubbish were thousands of broken tobacco pipes, many of which bore the initials or trade-marks of the

makers. They are remarkable for their very small size, but it must be remembered that in the early days of this industry tobacco cost sixteen shillings an ounce.

This particular industry has gradually deteriorated in Hull, and to-day there are not more than one or two tobacco-pipe makers.

Another important trade which has disappeared



HARPOON GUNS.

was the whaling industry, which originally commenced in the reign of Queen Elizabeth, reached its maximum about 150 to 100 years ago, and finally died out about the middle of the last century; and there are still people living who can remember the time when the "Truelove," "Diana," and other old whalers used to come into the town after being away in the Arctic for twelve months or even longer. These ships went in search of whales, which produced the valuable whale-oil, so much in demand formerly for lighting the streets, and for numerous other purposes. In

THE ALEXANDRA DOCK, HULL.



addition, the baleen or "whale-bone," was valuable on account of its tough and flexible nature. At one time this material is said to have realised as much as £4000 per ton. It was generally used in the manufacturing of umbrella ribs, corsets, crinolines, sieves, and many other objects.

With the object of catching these whales, the boats and crews were provided with numerous varieties of harpoons (some of which were fired from guns, and others were thrown by hand), large lances or knives (some being four or five feet in length without the handle), "spades," flensers and other weapons, a fine selection of which, together with numerous pictures and other relics of the old whalers, are preserved in the Wilberforce and Pickering Museums.

As a result of the enormous number of whalers visiting the Arctic Seas, not only from Hull, but from Dundee, Aberdeen and other ports, the whales became fewer in number and much more difficult to capture, consequently time after time ships returned empty, or "clean," and the industry gradually waned, but from its ruins sprang up the great fishing and oil industries which form such important factors in the trade of Hull to-day. The scarcity of whale-oil resulted in new sources being sought, and finally the cottonseed, linseed and other oils were obtained by extraction in the various mills.

Similarly, the men trained in the whaling industry were most suitable for manning the old fishing smacks, which in former days supplied a large part of the population of this country with fish, these smacks being gradually supplanted by the quicker and more effective steam trawlers, which during the war played such an important part in assisting the Navy in its



HULL WHALEBONE CLEANERS.

work. In more recent years, flour-milling, chemicals, creosote, machinery, margarine, cement, paints,



HULL WHALING SHIPS LOCKED IN THE ICE IN THE ARCTIC.

canisters, starch, blue, blacklead, chocolates, and many other important industries have sprung up in various parts of the city and its outskirts.

THE ANTIQUITY OF HULL

By T. TINDALL WILDRIDGE

ON the history of Hull writers differ. Some allow it but a moderate age, considering the site low. The reply is that it is a slight natural knoll, as proved by every flood.

Next, did the River Hull change its course? The Book of Meaux says it did so, from a western course encircling the site, assuming a southern direction east of the site. The early loop embraced more than the actual site, and was called the Wyk of Holderness, and the town, as first met, was called Wyk. Records corroborate, and this is the view generally accepted. It places the Wyk in the territory of Holderness, and in the fee of Albemarle, ex the Archbishop of York.

Two writers of acumen have denied all this, suggesting or stating that the river ran always as now, and that the Wyk was in the territory of Harthill. One of them considers the matter proved by proving the Wyk, or some parts of it, to have been at one time in the fee of Mortimer (Ferriby).

The matter of fee became controversial mediaevally, and there is equal evidence on both sides. Owing to the interests at stake, the verdicts of inquisitions, being contradictory, are unreliable, and rule each other out.

Yet there was no mediaeval denial of the existence of the old river-course.

Here I present a new explanation which, naturally, I consider will hold water. *The “new passage” was not an entirely new channel, but in its greater extent a natural creek, which had been used as a port for an indefinite period.* The new cut was, consequently, only through a short neck. This has two points of direct evidence. (1) In 1884 there was found, *in situ*, at 50 High Street, vertical oak and birch piles, with remains of wattling, enclosing a great deposit of bones of all the domestic animals, those of the sheep predominating, all large and marrow bones being broken small, and the whole imbedded in silt a considerable distance from the harbour edge. This supports the idea of a wide creek in prehistoric times. (2) When the port was granted to the Town in 1382, it is described as “the port below the town, formerly called Sayercryk, now called Hull”—an epitome.

In Domesday I identify the site, among the lands of the Archbishop of York, as an appanage of Drypool : “In Drypool 3 bovates and Soke upon 5 bovates.” Soke was land rented to freemen, and generally irrecoverable. Most towns have their early history associated with socage rents. The above 8 bovates are returned as “waste”; this is to be read, not as “devastated,” but as “rendering nothing to the a/c.” The 5 bovates, 70 acres, was about the area of the old town before the accretion south of Humber Street.

The silence as to a possible port is nothing. Also silent are other documents, including Edward I.’s Infooffment of 1293, as to any port or waterway. The socage nature of the 1293 tenures is undeniable.

BRIEF CHRONOLOGY OF ELUCIDATION

1150. Meaux Abbey was founded by Adam, a monk of Riveaulx, by the munificence of Wm. le Gros, Earl of Albemarle. In ten years Adam had reduced the monastery to bankruptcy, and retired.

C. 1160. The second Abbot, Philip, was evidently brought in to stabilize the Abbey, and had finances at command. There was evidently a strong movement to help him. He bought, as well as only less important outside lands, all the property of Sir John de Melsa in the Wyke of Holderness (viz., the socage of the town of the Wyke). Other portions of the Wyke were given by Benedict of Seulcoates, and Sir John de Sutton.

Those three were on these transactions quit-claimed by the representatives of Wm. Suros (Secures), who had held the Wyk of Holderness.

1168. The first mention of a local port occurs in the last year of Richard I. It strikes the note of the reputation the Port of Hull later earned as a smuggling outlet for the Yorkshire wool: 45 sacks of wool were seized and sold "apud Hull," realizing 225 marks.

1204-6—The Collectors of the tax of $\frac{1}{15}$ of the goods of the Merchants of the Ports of the Sea, collected "in portum de Hul," £34, by which it appears as the seventh port of the kingdom.

C. 1205. A portion of the above appears to be 3½ marks levied on "Radulfo de la Hulle," which the Exchequer on appeal ordered to be returned to him, he being "the man" of the Brethren of St. Lazarus. The Order was allowed to have, tax free, one agent in each port, such officers probably having in charge the reception and shipping of pilgrims.

1205.—King John's wines were conveyed "de Hull" to York.

1213.—Abuses by the servants of the Archbishop of York were alleged in the port. The account affords the information that both sides of the haven had quayage.

All through the thirteenth century the Archbishops made efforts to maintain (or to establish, as the case may be) their position as the port authority, but were continuously resisted.

1226.—A Saer de Sutton was Bailiff [Collector of the Customs?] of the Port of Hull.

1229-30—The Merchant Gild of Thomas del Hull owed [the Exchequer] 20s. on account of the flight of Robert [who was no doubt an absconding surety]. "Gilda Mercatoria Thomæ del Hull debet xxs. pro fuga Roberti." [Great Roll, 14 Hy. III.]

Men in such a solidarity of tenure as is later revealed would secure at an early date the necessary licence. Blackstone states that the grant of Gilda Mercatoria was in itself an incorporation. Malet Lambert qualifies it thus: "The Gilda Mercatoria was one of the most prominent marks of a free borough." The status of the Wyk merchants in this respect explains the low fine (100 marks) they offered for their borough charter in 1299.

1269.—The Archbishop (as holding the Sutton side) and Joan de Stuteville (as holding, say, Sculcoates and all the parts westward) agree as to a chain being continued across the River Hull at Stanfordrak for the security of the country in times of war and tumult.

"Stanfordrak" is Saxon—the "Stone Ford Channel." It was apparently an early name for

Sculcoates Gote. This was the place where the Hull originally turned west.

The Chain, at the limit of the Wyke, appears to have been a mark of the Old Hull. If we can venture on a visualization, that stream came through the midst of a segment of reedy swamp, with no landing until the low levels were passed beyond the ferry bend. To control the progress of vessels was the object of the Chain. When the Old Hull was no longer an effective stream, the Stutevilles would be jealous of their prerogative with respect to the later course, and consider their ancient chain desirable against possible buccaneering elements among the Haven frequenters.

The agreement was, no doubt, entered into for the clause providing that the Chain should be, on occasion, drawn back so as not to impede vessels, perhaps a subject of recent complaint.

There was another Chain at the mouth of the Haven, but there is no indication of when that began. The oldest plan of the Town shews it *in situ*. Of whatever age this chain was, it was renewed during the Wars of the Roses.

1271.—A dispute occurred between the Abbot of Meaux and the Archbishop as to a strip of land in Wyk, $37\frac{1}{2}$ feet by $5\frac{1}{2}$. I take it to have been an appropriation by the Archbishop's tenant at Bishop-lane, Staithes, which was not quite opposite Bishop Lane. The Archbishop's holding was in Aton Fee, and the stolen path on a Meaux tenancy. The Archbishop had to restore the land. But the matter is here on account of the jurisdiction. The Archbishop declared that the land lay within the Liberty of St. John of Beverley, *i.e.*, was land of the See; the Abbey that it was

within the Barony of De Vescy, and so took the matter to York. A jury declared it within the Barony. Whereupon the Archbishop's side withdrew, and were cast in default. If the Meaux holdings were notoriously in the Barony, the Archbishop would scarcely have been so stiff to the contrary. Animosity against the Archbishops may have influenced the matter.

1272.—The Archbishop purchased from Wm. de Wyk, son of Simon de Wyke, a property at "Wyke upon the Port of Hull." Probably this included the above screed.

1274, etc.—Hull is mentioned among the ports which smuggled wool to Flanders, despite the total prohibition.

1278.—The Abbot of Meaux obtained a charter for a Market and Fair at Wyk. In view of various documents bearing on the ground-plan of Wyk, we may be justifiably of opinion that, so far as the market was concerned, the charter was current legalization of something pre-existing.

C. 1278.—"The Bailiffs of Hull" are to examine merchants in respect of attempts to carry silver abroad.

C. 1280.—A charter (in the writer's possession) of a feoffment at Wyk, speaks of the Tenure being according to the laws of the merchants. The rent is called "service," and all the clauses are in accordance with soccage-rent conditions. The Gild Hall is mentioned [as it is in the inquisition of 1293].

1281.—Hedon, by an inquisition, urged that there were near that town two towns, Ravensea and le Hull, with good ports increasing from day to day.

1286.—The Abbey, in one of its frequent inept muddles, mortgaged the Town of Wyk [and the

Grange of Myton] for 20 years to the Dean of York and his brother; but the Dean, wishing to vary the bargain by taking a yearly rent of £100, the Abbot borrowed the amount of debt from his General Chapter.

1287.—Hamo Box was deputy of the King's Butler's deputy for the collection of the King's Prises and Guage of Wine at "le Hull."

1289.—The Abbot of Meaux's Bailiffs were ordered to facilitate the Butler's deputy in the above collection.

This is the one solitary instance of anything implying that the Abbey had any function in the port. It would not be surprising to find that the bailiffs, as Bailiffs, were unimportant, or did not exist.

1289. Thomas de Scardeburgh, Archdeacon of the East Riding, wished to found a House of White Friars in a messuage he held of the Abbey on a benevolent tenure. A jury found it would prejudice the Abbey. They added that Scardeburgh held of the Abbey, who held of John de Melsa, who held of Wm. le Constable, who held of Wm. de Vesey, who held of Edmund de Mortimer, who held of the King in capite.

Presuming a Saxon port, probably the Archbishops were overlords of Wyk, and the Creek authority. After the Conquest, becoming more feeble and intermittent, they lost their grip, and we may more than guess at an era of competition tending to their being ousted. One Archbishop never seems to have known what another had said or done. The early rights of the See in Waghen (with Sutton and Drypool) appear to have been extensive; and their consideration in

relation to the feudal rights of the Albemarles is a suggestive though exasperating subject. So far as the See held Drypool, so far would it hold the Wyk,^{*} and, as will be seen under 1297, the supposition is that Albemarle held Wyk of the See.

It may be well to note the course of the Archbishops' claim to continue beneficiaries of the port dues. Edward I. was interestingly antagonistic. In the time of Edward II., the De la Pole brothers had the ear of Mortimer, and the Archbishop could do nothing. On the fall of Mortimer, the Archbishop at once put in a revived and revised claim. But his information was faulty; though Richard De la Pole had retired, William was stronger than ever. The claim was turned down. Nothing more was heard of it until 1370, when it reared its head for the last time, and probably it was Michael De la Pole who suavely killed it. All these excitements are strongly reflected in the history of the town.]

1292.—Hamo Box, one of the chief tenants of Wyk, Master of the London Company of Rope-makers, and Sheriff of London, wishing to found a mass-service at Holy Trinity, obtained the licence of the Archbishop to choose two priests for the purpose. The licence styles the Chapel "Our Chapel of Hull." In the charter of feoffment mentioned under 1280, the chapel is styled "The chapel of the Prior and Convent of Watton," concerning which space forbids more.

Box had recently returned from a "pilgrimage" to Rome.

1293.—Wyk [and Myton] passed by exchange from the Abbey to Edward I.

The item as to devolution of fee is as follows:

"The Abbot and Convent of Meaux hold all the vill of Wike of Sir John de Meaux, except 9½ acres which they hold of Sir Gerard de Furnival of the fee of Sir Wm. de Vesey and except 6 tofts which Sir Wm. de Aton holds of Sir Wm. de Vesey in le Wyke by knight service." In "le Wyke" is discriminating, because some of the tofts were outside the actual vill. Probably these were the three tofts held in villenage; and so the "5 Bovates of Soke" are inviolate. It is a little significant that the three outside tofts (north) run north-south, while the town lots run east-west, evidently to share out access to the original Creek, of which the Town-line must mark the extent.

There were 108 tenancies of the Abbey, some of which were, no doubt, sub-let in part; and there were twelve plots vacant.

Little or nothing can be argued from the names of the tenants. Eight can be associated with Holderness; three (one each) with Myton, Newland and Anlaby.

The plots make up very closely the modern plan of the town. They are without boundaries or measurements, but by comparison with a measured survey of 1347, whose items follow in the same order, and have equal rents attached, it is seen that we have Wyk yet with us.

Any theory giving antiquity to Hull has to contend with the criticism which does not admit that the place called Wyk was the place called Hull.

The matter may be intelligible thus: the Port of Hull was the official and technical name of the water-way only. But the River was the centre of local life, and its name became associated with everything round it. "De Hull" meant from, with, in, or by the Hull. It was applied to pastures and a farmland on the

Drypool side. The most important place, which was Wyk, would attract to itself the association of the River's name in the most lasting manner. Wyk was the town on the port, but it was not a port ; even when as a legal quay it became the Port of Kingston-upon-Hull, it was not the Port of Hull, which remained distinct. Hence, as Colonel Saltmarsh points out to me, the port of Kingston-upon-Hull and the Port of Hull are mentioned together. The two became one in 1382, when the distinction vanished.

But in nomenclature "Hull" was always undermining "Wyk." "Wyk" comes back to the "Creek," or "Pwl"; and there was nothing inappropriate in styling Wyk "Hull." To imagine a *place* Hull which was not the *place* Wyk, is to summon up the necessity of imagining an unrecorded dwindling, or an unrecorded dislocation and finis, of some town called Hull, the name of which at an ungiven date was taken by Wyk.

When Chaucer said of his sailor : "There was none such from Hull to Carthage," there was no place legally called Hull, any more than there is to-day. He knew Hull was the River Hull, which was a port ; but also he knew it as a place where his friend Michael De la Pole was the great man. It had ceased to be Wyk then, but it had not when Archbishop Melton called Holy Trinity "our Chapel of Hull."

C. 1292.—The name of "Wyke upon Hull" was changed to "Kingston upon Hull."

1297.—Occasion presented itself by which it was put on record by close implication that Wyk was in the fee of Albemarle, and a clean sweep made of all competing feudalists.

• • • • •

A man on a foreign ship in the Haven was sick. He went on shore to the priest of Drypool, and was shrived. He returned to the ship and died, being taken next day to Drypool for burial. During the ceremony a number of the Archbishop's bondmen and officers from various places forcibly took the body away and held an inquest. The jury found that the man died by an accident, and the prelate's bailiffs seized the ship and cargo as *deodand*, not releasing it until £20 was paid. Later, these occurrences were investigated by a jury, called before the King's Escheator, who found that the acts had been against the liberties of the Earl of Albemarle, and in contempt of the King, inasmuch as the rights of the Crown on both sides of the port and river, from the end [by another reading "exit"] of Old Hull to Humber, belonged to the Seigniory of Holderness.

This was apparently not definite enough. The same Escheator impanelled another jury, who found that the entire dominion of the Port of Hull belonged of right to the Earl of Albemarle, whose fee extended along both sides of the river, the freehold of the west side of [more probably "from"] Old Hull ("de le Veil Hull") to the Humber, being of his fee, and the eastern side being held of him in *capite*.

It is extremely valuable to have it so clearly laid down that there was an Old Hull River, and that the place of its early "exit" could then be quoted as a thing of common knowledge.

The main conclusion is that the town, by whatever name, was no Edwardian mushroom.

ERRORS AND OMISSIONS EXCEPTED

Merchants, with nearly every opportunity for accuracy, inscribe their accounts "E. & O. E." Historians otherwise; yet their materials, generally too slender to be absolute upon, leave them always in need of checking.

This present thesis is the mere bone of a fuller account, which might be more persuasive,—or less.

THE RISE AND PROGRESS OF THE CITY AND COUNTY OF KINGSTON-UPON-HULL

BY THE LATE

SIR ALBERT KAYE ROLLIT, K.B., LL.D., D.C.L., D.LITT.*

THE Editor having asked me to write this Chapter of "The Handbook," I have pleasure as a Hull man, and as one interested, both personally and materially, in the progress and prosperity of the City—in complying with his complimentary request. And I am the more readily induced to do so because, in these modern days, in which knowledge is the basis of business, a great need exists for a concise History and Compendium of the Commerce, Trade, and Industries of the City and Port of Hull, for use not only at home, but beyond the seas. For another reason, nothing but advantage can result from the wide publicity to be given to the contents of this Handbook. Because, though Shakespeare does not exactly say so, it is nevertheless true of Towns: "Sweet are the uses of advertisement." And possibly my intimate acquaintance with Hull and its affairs during my whole life-time, as one of its long line of Mayors and Sheriffs, as a former President of its Chamber of Commerce, as a Hull Dock Director, and otherwise, may justify my attempting what has been asked of me; as I

* Sir Albert died while this handbook was being printed.—ED.

recently helped to do the same thing in the case of the City of Paris.*

First, of the origin and rise of our City, so far as these bear on its present and future position. For the history and traditions and the surroundings of Hull largely account for its standing to-day as "The Third Port in the United Kingdom," and justify a sanguine forecast of its prospects, by virtue of historical continuity and of its citizens' inherited energy, enterprise, and public spirit, which are the conditions of civic progress and prosperity. Our great citizen, Andrew Marvell, who, though poor, and the last Member of Parliament who received a salary paid directly by his constituents for his services, was yet an incorruptible patriot in a corrupt age, struck the true note when he wrote :—

" How much one man can do,
If he both act and know,"

while our William Wilberforce, the Slave-Emancipator and Philanthropist, inspired a higher power of personal achievement by raising the standard of human character and action. The principle of heredity determines the development of nations and communities no less than individuals ; birth and training tell in the human, as in the horse, race, though we carefully select and train in the one case, and too often neglect to do so in the other. Nor do we forget that our ancient Trinity House, of which Hull has reason to be proud, as I am proud to be one of its Elder Brethren, was, in the quaint language of an early century, founded

* " Annuaire Commercial Franco-Anglais Preface par M. Pierre Baudin, Ancien-Ministre de Commerce, et Sir Albert K. Rollit, M.P., Directeur de la Chambre de Commerce Anglaise à Paris."

"to improve the breed of seamen"—a national, no less than a local, service which it has well fulfilled, largely through its great and practical Nautical School, one of the few training grounds for British officers and men of our Mercantile Marine, and for the Royal Navy.* And that the Hull "breed of seamen" was one worthy to be kept up is shown by Geoffrey Chaucer's reference to it, in 1364, in his "Canterbury Tales"—"There was non such from Hull to Cartage."

In pre-historic times—that is in days of which there are no written records, though many relics, and as to which many things are matters of inference and conjecture, more or less cogent, and even of imagination more or less restrained—what is now Yorkshire and Hull was inhabited by a Dolicho-Cephaloid race of Celts, these Greek words merely meaning "Long-heads," just as Edward I. was nicknamed "Long-shanks;" and this long-headedness is still a characteristic of Yorkshiremen. Afterwards, there were, in the hinterland of the present Holderness and Hull, the Brigantes, or highlanders, named in Juvenal and the Classics as the most numerous and important of the British Tribes, and the Parisi, or herdsmen, both brave Yorkshire peoples who were among the last of the ancient Britons to submit to the Romans. Then came successively the warlike Saxons, Angles, Danes, and Northmen or Normans, each arriving as invaders; so we Yorkshiremen are a mixed race, coming of some of the most virile ethnological stocks, such as the Vikings and Sea-kings, and trained to courage and endurance by the ordeal of battles both by sea and land, and especially

* See the remarkable Hull Trinity House Roll-of-Honour of old scholars, officers and men, serving in the European War.

on the Humber and the Ouse, the banks of which were frequently devastated even as high up as York, which was more than once sacked, while the Northern Counties were also the last to be subdued by The Conqueror, or to quail before his oath—"By the Splendour of God." And still, to-day, Yorkshiremen wear, as their County Emblem, the White Rose, but never the white feather, and owe to our distant forefathers and their evolution and environment something of our seamanship, and our grip and grit, of our strenuous progressiveness, and of the clannishness of our county character, coming to us from the times when our ancestors were compelled to stand shoulder to shoulder in constant combat against the fiercest foes, just as much as our patient persistence and persistent patience may be attributed to the mountainous marches and the weary plodding to and fro over the bridle-paths of the Pennine Chain, and other ranges, of our nearer forefathers alongside the pack-horse, which was, the commercial carrier of their day. To show the spirit in which our early invaders were met,—for I like the men who have some iron in their souls,—let me cite the epitaph on one of them, the giant Harold Hardrada: "He got his promised portion of our soil—seven feet of ground—or as much more as he is taller than other men."

Passing, as interesting historical incidents, that Henry I., the youngest son of the Conqueror, was born not far from Hull, at Selby, in 1070, and thus became our only King who was also a Yorkshireman, and that the first Prince of Wales, afterwards Edward II., only missed by a short time being born at Hull and becoming Prince of Yorkshire, history records that Edward I. was, in 1296, the founder of Kingston-upon-

Hull, the King's Town upon Hull whose Municipal emblem is Three Crowns.

"O ! well-walled Royal Town, thou hast Three Crowns ;
Therefore, love thy King, thy benefactor."*

Probably, King Edward--who, after meeting and beating the Scots, was staying with Lord Wake at his Cottingham Castle, near Hull -whether guided, as tradition says, by a hunted hare, or not -rapidly realised Hull's potentialities as a town and port ; for there was, from much older times than the thirteenth century, more than one fishing haven and hamlet at and near the confluence of the Rivers Hull and Humber, and on both banks of the former river. But, although the long pre-existence of Myton, (mentioned in Domesday Book), Wyke, and Hull, places of some importance, indicates that the harbour at the junction of the river Hull with the estuary formed by the waters of the Ouse and Trent—the Ouse leading to the Metropolitan City of York and to Yorkshire, the Trent to the Midlands, and all to the sea, only twenty miles distant—was destined, by geographical position, to be the great strategic, shipping, and mercantile place which it has since become ; nevertheless the citizens of Hull are none the less entitled to be proud that perhaps the very ablest of mediaeval monarchs—this first Edward, one of England's greatest Kings, soldiers, statesmen, and law-givers, "The English Justinian,"—came, saw, and named "Kingestona sur Hull," now our Royal City of Kingston-upon-Hull, gave to it its first charter in 1200, and also showed his practical business-like instinct by personally pur-

* Inscription, in ancient Greek, over the Headmaster's Seat in the old Hull Grammar School, where Andrew Marvell, M.P., and William Wilberforce, the slave-liberator, were pupils.

chasing in exchange for lands in Lincolnshire, part of its splendid river-side site. Indeed, this shrewdness of such a Sovereign raises a presumption in favour of the permanent pre-eminence of Hull, grounded as it was upon physical facts and conditions, which still subsist and are recognised as bases of Hull's commercial supremacy ; and, equally, the vindication of the King's good judgment. It is a parallel of an incident in the history of the Port of London, when another King, James II., having taken from the citizens their charters and privileges, and coin, and everything else he could lay his hands upon—as he also did from Hull—the Lord Mayor dropped upon his knees, cynically saying : “ Will your Majesty please leave us the Thames ? ”, knowing that therein lay the permanent highway to the City's commercial prosperity.

King Edward's soldierly skill was manifested by the value of Hull as a safe place and port-of-call during the Scottish wars of himself and his successors, by whom frequent royal visits were made in those times to Hull, which was free from the ravages and raids by the Scots marking the contemporary history of York. The King's wisdom was also shown in succeeding centuries by the historical fact that the possession of Hull did much to secure for those who held it the command-of-the-sea, and that it became the strongest naval and military base, magazine, and *place d'armes*, notably when it supplied 16 ships and 466 seamen—London even furnishing no more than 25 of the former, and 662 of the latter—and much money to Edward III., and similar aid to Henry V., during their French campaigns.

Then, a Hull merchant and shipowner, its first Mayor, and a philanthropist, Sir William De-la-pole—

Knight Banneret, Seigneur of Holderness, first of the lordly line of Suffolk, (which gave a Lord Chancellor, and very nearly a Sovereign, to England, and a Cardinal to Rome)—was the King's merchant-banker, under his firm-name of "De-la-pole Brothers." The Old Chronicle of Melsa or Meaux, at Wagen or Wawne, midway between Beverley and Hull, on the left bank of the River Hull, records that, as a merchant, he was "second to none"—"Mercandizandi Scientia instructus, nulli Angligenæ mercatori postea secundus fuit" (iii. 48). William De-la-pole was also the first merchant to become the founder of a great noble family, and thus to recruit the House of Lords from the English middle-classes, a notable fact in the history of English commerce, but one which caused his descendant, the Earl of Suffolk, to be taunted by his contemporaries as "a merchant himself, and a merchant's son."—"Vir plus aptus mercimoniis quam militiae Hie plus trapezitis in pace consenuerat quam armatis in bello" (Chron. Angliae. 1228-88.)

In the Wars of the Roses, Hull, from remembrance, probably, of its civic obligations to Henry VI., was strenuously and helpfully Lancastrian, one of its Mayors having fallen fighting for the Red Rose at the battle of Wakefield in 1460; while in the days of "the Pilgrimage of Grace" in 1538, an East Riding of Yorkshire reactionary insurrection to restore the old Catholic order, the town was, as in the Stuart days, as at the Revolution of 1688, and as always, a strong source of support to the Protestant cause. Again, in the stirring times of the Spanish Armada, Hull sent ships, guns, and men to Queen Elizabeth to help to meet and crush the invaders; while, in the great Civil War, the earliest acts of hostility between King and Parliament were

aimed at the possession of Hull and its Citadel, as being, with their munitions and military stores, the key of Northern England, a key which, in the hands of the Parliament, was a great factor in the prologue of the war, Hull closing its gates in the face of King Charles I., and subsequently withstanding two sieges, during which it was supplied with food from London, under the protection of the Parliamentary ships-of-war ; indeed, at one time, Hull alone of Yorkshire towns stood for the Parliament. The changed times are well shown by the barbican-like turret Watch-Tower of this old Citadel, of which it is the only relic, and which until recently stood on its original site, forming part of the Humber Iron and Shipbuilding Works at the mouth of the River Hull. This turret was presented by the late Mr. William Bailey's Trustees to the Corporation, and has been removed and re-erected in the East Park.

The splendid foresight of King Edward is thus an asset of Hull to-day, and the King's prescience is the more remarkable in that it existed in days when York was the great northern port of England, when Hedon, still a Municipal Borough, was a close and formidable commercial competitor ; and when Ravenspurne, the landing place of kings, was a seaport, a parliamentary borough, and a market-town, at the mouth of the Humber, though doomed soon to be in the deep bosom of the ocean buried, as happened in the sixteenth century, when it was swept away by the sea into the sea.* For though, in 1298 (26 Edward I.), the King, by Proclamation, declared Hull the only Yorkshire port for the export of all wools and leather, and it

* In 1344 Ravenser and Ravensrod were required to send each "a man well versed in naval affairs to advise King Edward III."

was also designated one of the stations for a royal mint, the town only won its way slowly at first to the full enjoyment of its natural rights, which were contested from time to time by the Archbishop of York, who, for instance, for many years claimed prisage of wines at Hull—a remnant of whose one-time local power and jurisdiction exists in the Archiepiscopal Arms, which are still the sign of "The Cross Keys" Hotel in the Hull Market Place—and by Leeds, Gainsborough, and other up-river Ports, especially in reference to rights and dues in respect of the Derbyshire lead, the wool, the leather, and other shipping trades. Moreover in the reign of Edward VI., there was a project to open two Free Mart Towns, especially with a view to woollen trades, of which Hull was to be one, for the North, and Southampton the other, for the South, but the proposal was opposed, and was never carried into effect.

Thus, early in the thirteenth century, King Edward I. must have seen clearly that York was already too far inland, and the navigation of the Upper Humber and the Ouse and Trent difficult and dangerous; that what Shakespeare calls, in *Henry IV.*, "The naked shore of Ravensburg," was unprotected and too near the sea for safety; and that Hull was the real water-gate of the North of England and Yorkshire and the Midlands, ultimately to become the great manufacturing and consuming districts of the country, and the Humber itself the safe and secure harbour of the East coast, within that natural breakwater, The Spurn, built up from the sea-churned ruins of the coast of Holderness.

This constant and rapid erosion of the friable glacial boulder-clay cliffs of the Yorkshire coast, to

the extent of about two yards a year along a line of over thirty miles, is a matter of national concern ; not only Ravenspurne, but many other towns, whose names or site-names appear on old maps, have, in fact, disappeared into the insatiable sea,* though it has been said that traces of them have since been visible at abnormally low tides, that even the chimes of their churches, rung by the waves, have been heard, and that their graves have been seen to give up their dead. And equally national is the obligation to maintain this barrier reef of The Spurn, the only natural harbour-of-refuge on the North-east Coast, under the lees of which is sure and safe anchorage — an obligation and a burden which ought not to be permitted to be shifted upon the Humber Conservancy Authority, as recently proposed.

And this geographical situation, discovered and utilised by King Edward I., has been, as we shall see, with its external and internal waterways, the making and the keeping of the greatness of Kingston-upon-Hull. The Humber is, indeed, one of the greatest rivers in Britain. None other collects the waters of so wide an area, equal to nearly a sixth part of the Kingdom ; no other river system connects so many large towns. So important was it in early times that, by Charter of Henry VI., the first English Charter of Municipal Incorporation, it was provided that an Admiral of the Humber was to be appointed by the Corporation, and to have jurisdiction upon its waters, independently of any other of the King's Admirals ; and the Lord Mayor of Hull is still, by virtue of his office, such Admiral, and entitled to fly his flag bearing the City Arms, and to have it saluted by six guns from

* See Sheppard's "Lost Towns of the Yorkshire Coast," 1912.

His Majesty's ships, and this jurisdiction and right have frequently been officially recognised by the Admiralty and by officers commanding ships of war in modern times; and by this same Charter of Henry VI., Hull was created a County of itself, its proper description being "The City and County of the City of Kingston-upon-Hull." Hull, therefore, is not, except for some minor administrative purposes, in the East Riding of Yorkshire, and, hence, the city has its own Sheriff.

So much, then; nature has given to Hull its unique topographical position in relation to the North Sea and its unrivalled means of internal communication both by land and water. To these may be added a good climate from the standpoint of the workshop and supplies of the prime necessities of life in purity and plenty—pure air from the adjacent sea, river, and wolds; pure and inexhaustible spring water; and means of housing in brick clay of the best quality, Hull having been the first place in England, since Roman times, to revive the making and use of bricks and tiles as materials for building. Other minor advantages are a level surface, or very easy gradients, reducing the cost of haulage, while the facilities for obtaining freehold sites are also an attraction to Hull, for the suitable "location" of business premises is becoming a recognised commercial consideration. The trade of Hull seems, moreover, to have been comparatively free from mediæval municipal restrictions during a period when, like the knights themselves, trade and commerce were usually clad in armour, this commercial freedom having probably been due to royal interest in the Town as a Free Borough and to the consequent comparative paucity of close trading corporations and

companies, though there were the Guild of Shipmen (apparently a religious pioneer of our Trinity House), The Company of Merchant Adventurers, The Fellowship of Merchants, The Company of Coopers, and some few others.

And man has made the most and the best of these natural and other resources. Hull men may reflect with satisfaction upon the municipal development and activities and attractions of their City. I can just remember the days of defective water-supply, and of bad sanitation, in the late forties, and the consequent cholera and other epidemics, sought to be averted or abated by tar-barrels burning weirdly in the public streets ! I saw Lister Street thus illuminated in 1849. Sanitary and hygienic science had not then advanced much from the days of the "Black Death," the "Sweating Sickness," and "The Plague," all of which ravaged Hull, the last making frequent visitations. Such plagues and pestilences and, indeed, all zymotic diseases—the diseases of dirt—might, and ought to be, extirpated by preventive legislation and sanitation ; they are the causes of the most destructive and wasteful of all incidents in municipal administration. In relation to the public-health, and so to individual strength and the common wealth, parsimony is not economy ; for the cost of epidemics is disastrous, to say nothing of the loss and suffering from the diseases of daily life. The chief significance of a low death-rate is that it means not merely longer, but healthier and more livable and serviceable lives.

Happily, in Hull, there is now no ground to attribute to the municipal authorities any dereliction of duty in these respects, the modern returns as to the death rate and zymotic and other complaints being

satisfactory, as shewn by the following striking comparative figures, furnished to me by the Town Clerk, which clearly indicate that, upon the average, the inhabitants enjoy both long and healthy lives :

DEATH RATE.

1874.	1913.	1921.
23.8 per 1000.	14.7 per 1000.	13 per 1000.

DEATH-RATE OF INFECTIOUS DISEASES.

1874.	1913.	1921.
5.2 per 1000.	1.75 per 1000.	0.9 per 1000.

Thus much has sanitary science narrowed the grim kingdoms of Disease and Death !

The Municipal Corporation has also done its duty to the City in other ways. Modern public improvements have altered the face of Hull ; main roads have been widened ; in place of narrow, crooked, crowded thoroughfares and congested areas, there are now spacious avenues and stately streets. These are well paved and drained, well cleansed, and quiet, for the motor-omnibus was here anticipated by good, cheap, rapid, and comparatively noiseless tramcars with constantly advancing rail-heads, thus opening the outskirts to the urban and artizan population, and, by supplementing the Corporation's urban workmen's-dwellings, aiding in the solution of housing and public-health problems. Hull thus owes to municipal administration much of its health, comfort in living, and attractiveness to strangers frequenting it on business or pleasure.

An official of the National Radiator Co. told me that one of the chief reasons which brought the Com-

pany to Hull with its new works was the ample supply of good water, and, in this vital respect, the record of Hull is a striking lesson, and at once a warning and an encouragement in public administration. So early as the fourteenth century Hull men fought for good potable water with the inhabitants of surrounding villages. In 1402, after litigation, the town secured a supply from Spring Head, Anlaby, which continued until 1845. In that year the death-rate (as quoted by a former Town Clerk, Mr. C. S. Todd) was $23\frac{3}{4}$ per 1000. In the latter part of the same year, new works were opened at Stoneferry, giving a service from the River Hull, which is tidal, and which received more or less contamination by sewage, and the death rate immediately rose, in 1846, to $33\frac{1}{2}$ per 1000, or by nearly 50 per cent. In 1847 it was $31\frac{1}{2}$; in 1852, $30\frac{1}{4}$. In 1864 the river supply was abandoned and cut off, and in 1865 the death rate fell to only 22 per 1000!

The high municipal character of modern Hull is also attested by the following, among other, recent Corporate and public works and undertakings:—New and better bridges—once the causes of great delays, inconvenience, and loss of time, tides, and trains, veritable Bridges of Sighs, if not of size—over the docks and the River Hull.

Electricity works and plant for the supply of light, and heat, and power, reinforcing the Hydraulic Power Works, which were the earliest-established ones in England; a local Municipal Telephone Service; new Municipal Offices, City Hall, Art Gallery, Museums, Guildhall, Law Courts, Headquarters of Police, and Post Office; Foreign Cattle Wharf and depot, with lairages, abattoirs, and chill-rooms, and with direct loading facilities.

The Railway Station has also been enlarged and improved, while the hotels compare favourably with days I can remember, when they were not unlike those of Galway, as once described to me by the late Lord Morris : "There are only two, and -whichever you're at you'll wish you were at the other."

Moreover, many of the new public, business, and private buildings in Hull are much improved aesthetically, compared with some of the older ones, though there is still room for greater diversity and taste.

The squares and streets, too, in addition to the high-standing column of William Wilberforce, which is the monumental mark of the city, and the gilt, hatless, and stirrupless effigy, by Scheemaker, inscribed "To the memory of King William III., our Great Deliverer," are now decorated by statues of Sir William De-la-pole, Andrew Marvell, and others, names which will not lead anyone satirically to say, with the old Greek philosopher "I would rather men should ask why there is not a statue of me than why there is one." Indeed, Hull is growing into what Gent prophetically styled her in his History of 1735 : "The Royal and Beautiful Town of Kingston-upon-Hull," and is justifying even the Military Recruiting Bill, issued during the American War, to obtain soldiers :—"They will be quartered in the delightful and plentiful town of Kingston-upon-Hull, where excellent ale"—for which Hull has always been reputed—"is sold at only three pence the full quart, fish of the best quality at one penny per pound, and shambles meat at a less rate than at most towns in the Kingdom." The names of streets, too, are better chosen, though there are still some such curious survivals as The "Land-of-Green-Ginger," one of the principal thoroughfares, most

probably so called from its having been a place for the manufacture or sale of green-ginger, a *conserve* of ginger and lemon juice, *temp.* Henry VIII. King Henry often visited Hull, and had a palace adjacent to this street, and green-ginger was then a fashionable comestible at Court—"because the land was so cold." There is also Rotten-herring Staith, named after the Rotenheryings, eminent merchants of Hull.

Again, in relation to the vitally important subject of Public Education, Hull has done well. The Hull, Kingston, and Hull and East Riding Colleges turned out many able men, and thus contributed to the high standard of public and business life, as has the more modern Hymers College; while the needs of primary, secondary, and technical education are liberally supplied and well graded, there being now a number of Higher Schools, comprising, besides Hymers College, the ancient Grammar School (to which the Corporation has done more justice in recent than earlier times), the Municipal Training College, Technical Schools and excellent and most useful Secondary Schools, the first of which, the Hull and East Riding College, I opened in 1887. There is also the great Marine School of the Trinity House, to which I have already referred, and which the Admiralty Education Inspectors have officially reported upon as "the Model Navigation School in every respect," and also, now, a well-equipped Training College for deep-sea Fishermen. The Hull Literary and Philosophical Society, by its Lectures, formerly including those on Saturdays; the Royal Institution Library, and the Public Libraries, in the long campaign for which many of us fought; the Church and Young People's Institutes; the School

of Art., the Authors' Priors' Movement in aid of Elementary Education, from whence all which I often receive grateful letters of thanks, as I did a day or two ago (June 12, 1882), from an old and present student of the Hull Harmonic Society, of which I was one of the founders; and other Literary and Scientific Institutions have also contributed to culture and so to commerce; and the time should soon come when Hull, like Leeds and Sheffield to the west and south of the county shall be the University City for the East and North Ridings and for North Lincolnshire.

Thus, the Municipal Corporation may justly be said to have well and fairly administered the affairs of the City, to have been free from that robbery which is robbery—for the jobber is a robber; to have achieved efficiency, without so failing in economy as to have just cause for saying that it has driven men or business away from, or deterred them from coming to, the City by wasteful, or wanton, expenditure of public moneys which is one of the worst of crimes—the plunder of the people, and especially of the poor.

Such are among the chief contributory causes and features of the position of the Hull of today. Time and experience have verified the vision of Edward I., for from his reign Hull has prospered and progressed. And now, taking the values of Exports and Imports as a basis of comparison, Hull ranks, as I have said, as the third port in the United Kingdom—London and Liverpool alone, and in that order, surpassing it, while Manchester, Southampton, Glasgow, Grimsby, Leith, the Tyne Ports, Bristol, Gade, and Cardiff, respectively come next in order.

The value of the Imports and Exports of Hull in 1913 was :

Imports ...	...	...	...	£49,840,283
Exports ...	...	...	...	£29,220,174
Transhipments ...	...	...	...	£ 5,543,960
<hr/>				
TOTAL	...	...	...	£84,604,417

which, compared with the record of ten years earlier, shews a striking advance, the value in 1903 being :

Imports	£32,601,063
Exports	£15,122,382
Transhipments	£ 4,932,532
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TOTAL	£52,655,977.

It will be observed that the Imports were about double the Home Exports in 1903, and the increase that is shewn in regard to Exports in the figures of 1913 is a significant and highly gratifying indication that the disparity, which was too pronounced (after allowing for local consumption, for Hull is a great market in and for itself) is being reduced, as it should be, having regard to the advantages of Hull as an Export Centre for so vast an industrial area and as the outlet for the main manufacturing districts, and to the number of regular lines and sailings to so many parts of the world.

A century ago the inhabitants of Hull numbered less than 40,000, and the Town Clerk informs me that, since 1874, the population has risen from 133,315 to 291,118; the area of the Borough from 3,621 to 9,359 acres; and the Rateable Value from £417,300 to £1,313,227 (1914).

To-day, however, Ports, like men, are to be judged not only by what they have, but by what they do; and, according to this modern standard, Hull stands both absolutely and comparatively in the very front rank of Ports. It is what a modern up-to-date Port must be—deep and cheap, safe, accessible, and attractive; such a port must have good approaches by sea, river or canal, with channels defined, and marked, and dredged if necessary; rivers must be straightened and canalised so as to adapt them to modern ships of great length, wide beam, and deep draught. A port must also have deep docks and sills, wide basins, and good piers, quays, jetties, and landing-stages, automatically adjusting themselves to the rise and fall of the tides, and this, if necessary, on both rivers and docks, as in the case of certain competitive foreign ports; and adequate equipment, appliances and facilities for quick loading and discharge of ships, freeing them of demurrage (for with ships, as with men, time is money), and reducing the number of handlings of cargoes as far as possible. There must also be adequate warehouse and storage provision (dry and cold), and a railway and water carriage system for the quick despatch of goods, whether overside into craft, or to rail, or on to quay, or into warehouse, or for transhipment.

In these and other respects, Hull conforms, both absolutely and comparatively, to a very high Port-standard. The Humber has no bar, it is an accessible harbour with good holding ground, and has a wide permanent channel, well-beaconed and buoyed and lighted for generations by the practical and experienced Master Mariners of the Trinity House at Hull, the seamanlike performance of whose duties has given

universal and unqualified satisfaction to the Marine and Mercantile community, and whose practical absorption for these Maritime purposes into the non-Maritime Humber Conservancy Board, as effected by a recent Act of Parliament, is unnecessary, inexpedient, and contrary to the best interests of Hull, of which the autonomy of the Trinity House is an ancient and valuable asset. The Pilotage service is compulsory and good ; the river has been well watched, new and approved river lines gradually having been prolonged by the Humber Conservancy Commissioners ; and the Docks, till 1893 owned by the Hull Dock Co., are now in the hands of the North Eastern Railway Company, while the new King George Dock is among the largest and best equipped in the world, and suitable for the most modern vessels afloat. Many years since I supported the proposal of the purchase of the Docks from the Hull Dock Company, of which I was for some years a Director (and also a member of the Humber Conservancy Commission), by the City, and their administration by one Representative Port Authority, and I am still of opinion that this would have been the best solution of a difficult practical problem and the widest and wisest policy. The total dock space, including the King George Dock, which is capable of extension, is 205 acres, more than double what it was twenty-five years ago. There is now also the extensive Riverside Quay of the North Eastern Railway Company and the River Pier of the late Hull and Barnsley Railway Company, both abutting on the Humber and available at all states of the tides. At Saltend there is accommodation of the most complete kind for dealing with every description of mineral and vegetable oils. There are also two large Timber

Ponds. The docks themselves have adequate equipment, in movable cranes and hoists, in steam, hydraulic, electric and other appliances, and also in facilities for loading, unloading, storing under sheds or in warehouse (with cold storage), and for delivery or despatch by rails, with which the Docks are connected, and by craft. There are also graving-docks of largely increased capacity, repairing-yards, etc. At the King George Dock is a Grain Silo of 40,000 tons capacity.

The Grain, Provision, and Coal trades may be taken as illustrations. The annual value of the imports of grain into Hull is now no less than £10,500,000, the wheat imports having vastly increased, and those from India being often larger than into any other port. Hull has thus become one of the most important milling centres in the world, and there is storage at the Port for upwards of one million quarters of grain in bulk, making it one of the greatest of all granaries; while the facilities for discharging, transhipment, and despatch of both grain and flour are very exceptional. As the result, splendid flour mills have been erected and equipped with the most modern machinery, and, as they mostly abut on the River Hull, they enjoy the best facilities for obtaining their supplies of grain and for the delivery of flour; so much so, that I have heard it stated at the Council of the London Chamber of Commerce, on the highest expert authority, that of the late Chairman of the London Corn Exchange, that the cost of working a cargo of grain at Hull is only one-third of what it is in London.

The same remarks apply to the Provision Trades - Fish, Fruit, Vegetables, Eggs, Butter, Margarine, and other perishable commodities which, fostered by quick despatch in early morning express goods-trains,

from cold storage, and in refrigerated carriages, have vastly increased in recent years, a leading position being rapidly regained. Hull is the principal Port of the Foreign Egg Trade ; vegetables and fruit now come to Hull from France, Belgium, Holland, Jersey, Australia, The United States, Canada, and Nova Scotia ; butter from Siberia, the Baltic, and the Sound Ports, to the value of between three and four millions per annum ; wine—for which Hull has been a most reputed port since the thirteenth century was one of its principal imports in the fifteenth century—chiefly from Bordeaux and the South of France. In the thirteenth to the fifteenth centuries, Bristol and Hull were the chief centres of the wine trade ; and in 1327, Richard De-la-pole, of Hull, was Chief Butler of the King. Several steamers have recently arrived in Hull with meat, cheese, etc., from Canada, of excellent quality ; and, when at Belgrade, some few years ago, I saw hams, bacon, etc., packed ready for shipment to London, Hull, and other new markets—the export trade between Serbia and Austria being temporarily closed owing to economic differences between the two countries—and these also were very good, the produce of the large-white Yorkshire breed of pigs. The abattoir arrangements were unexceptionally clean, sanitary, and wholesome, and well provided with refrigerating machinery, while refrigerated railway-vans were alongside and being loaded for shipment at Salonica.

Hull has, within about a quarter of a century, also become the “Third Coal Port.” When, in 1885, as Mayor of Hull, I presided at the Opening-Ceremony of the then Hull and Barnsley Railway and (Alexandra) Dock, it was then, I found upon enquiry, disputed,

and more than doubtful, whether Hull was legally a "Coal Port," within the customary meaning and construction of Charter-parties, Bills of Lading, and other Shipping documents, the annual shipments amounting at that time to only about 600,000 tons. Therefore, as this important point for Hull was one turning largely upon common knowledge and reputation, I made, officially, a formal and public declaration that thenceforward Hull claimed and was to be regarded as a Coal Port; and, that this demand has been justified by the event, is proved by the fact that the coal and coke shipments have progressively risen during the subsequent twenty-eight years, until they amounted, in 1913, to no fewer than 7,060,470 tons. Thus does freight follow facilities. The quantity of coal brought into Hull in 1913 was 7,045,005 tons, against 7,011,978 tons in 1912. And, such figures are not only record ones, but shew an increase upon the previous year, an advance which seems likely to continue owing to the increasing appreciation of Yorkshire and Derbyshire Coal, both at home and abroad. Hull is the leading Humber coal-export port by at least two and a half million tons in excess of its closest competitor.

Similarly, the railway accommodation of the Port is now very different from what it was when, in 1872, the present writer, then on the staff of the *Eastern Morning News*, wrote a leading article in that newspaper, headed: "Slavery, Slavery, Slavery!"—very strongly condemning the then existing local Railway Monopoly. Public opinion being greatly stirred upon the subject, this led to the Bill advised by the late Sir John Fowler, C.E., to construct a Tunnel under the Humber, with whom I acted professionally for the measure.

The Hull and Selby Railway (one of the first constructed, it having been opened in 1840), to connect Hull with Leeds and London, is now part of the North Eastern system, and it is still the main line to and from Hull. By it and the late Hull and Barnsley Line (now merged into the North Eastern Railway Company), Hull is connected, for both the Home and Foreign Trades, with the West Riding of Yorkshire, Lancashire, and the Midlands—the most densely populated and busiest parts of Industrial England.

Equally, the Internal Waterways to and from Hull are exceptionally good. No other river-system in Great Britain has such ramifications as the Humber, Ouse, Trent, and their tributaries, permeating, as they do, an area of some 10,000 square miles.

The Aire and Calder Navigation, dating from 1698, is at once the oldest and the most modern and model canal-system of the country, in construction, in working, and in traction by electric and steam haulage. This Navigation,* itself eight-five miles in length, places the Port in direct communication with the manufacturing districts of Yorkshire and Lancashire, through the Ouse and a chain of rivers and canals extending to between six hundred and seven hundred miles; the Trent and Humber Navigation system similarly connects Hull with the Midlands and the South; while one all-by-water-way to the West Coast has been pierced through the Pennine Chain, called “The Back-bone of England,” and “The English Apennines,” at Standedge, near Huddersfield, by a tunnel over three miles in length, one of the greatest works

* There is in the Trinity House at Hull a portrait of Sir George Savile, one of the Founders of this great Navigation, as there is also a monument at York Minster.

of the eighteenth century canal-period of English engineering.* A similar purpose is attained by the Trent Navigation and its associated canals and canalised rivers, which unite Hull with South Yorkshire, Newark, Nottingham, Lincoln, and the Midlands, including the great malting and brewing districts, which are largely supplied with barley from and through Hull, and also large imported consignments of Smyrna and Danubian barleys "to lighten the mash." The very large local brewing and malting business is also aided by the special rail and water carriage advantages of the Port.

River and canal facilities and competition, combined with railway independence, are, indeed, chief factors in the prosperity of Hull, accounting, as they largely do, for the convenience and economy of the Port ; for its cheapness as an outlet for manufactures, and in the handling of grain and other merchandise ; for the comparative lowness of the port, transport, and other charges ; and for the traffic facilities over such an unrivalled distributive and collective area, comprising one-seventh of the population, and one-fifth of the area, of England and Wales.

We at Hull enjoy these advantages as a valuable legacy of the canal-stage of English Engineering, owing to the immense benefits canals once gave to the nation in the transport both of goods and passengers, wherefore they received large remissions of port and dock dues and charges, which have survived some of the services

* Propulsion of the canal boats through this tunnel is, or was, effected by the bargees lying down on their backs in their boats and using their feet on the roof of the tunnel. The writer thus went through the tunnel in a skiff, many years ago, on the way from Huddersfield to Stalybridge. The railway runs parallel with the canal through the tunnel.

rendered by the canals themselves. This benefit also results in part from the fact that prior to 1778, when the first Hull Dock was constructed—which was one of the very earliest, if not the first, made in England—there were no adequate local quays for water-borne merchandise, which was consequently dealt with over-side, a free right which was reserved by the Hull Dock Acts, as is also partially the case in London. But, in this respect, Hull has been singularly favoured and fortunate, for, owing to its dependence on inland navigation before the making of railways, many privileges were granted to canal traffic, and these are now of the utmost advantage to the traders of Hull and the large productive, distributive, and consuming districts which it serves. For the Trade of the Port is very largely worked by craft (keels, sloops, and lighters), which load and discharge at the waterside mills and warehouses of the River Hull and elsewhere, and take the cargoes direct to the ship, or by over-side delivery *ex ship* into craft, or to the mills and warehouses, or to rail—or by canal; while the mills in the manufacturing districts are almost invariably situate on the waterways, in part a survival of the water-power manufacturing period, and in part due to the still existing water-need of steam power. And such craft make use of the Hull Docks practically free of dues, thus largely reducing cost of transit, and giving advantage to such cargoes in competition in the markets, an advantage which has been said to be shared by some 80 per cent. of the traffic of the Port. Hence the port charges are more favourable than at any of the largest ports of the United Kingdom, a circumstance specially advantageous to the transhipment trade, in which respect Hull is an ideal port-of-transit for the Continent;

and the value of its transhipment trade is, consequently, very large, viz., upwards of five and a half millions sterling per annum.

In business, variety is safety, and the diversity and volumes of the local trades and industries of Hull are so great as to make it more or less independent of the changing fortunes or fashions of staple trades ; indeed, there can scarcely be said to be a staple, unless it be seed-crushing and oil extraction and refining, of which Hull is the chief, and the ancient, seat, the industry having been connected with, and a successor of, the refining of Whale Oil in the olden days.

It was once different. Cloth-working existed in Hull, as a staple, in the sixteenth century. The name of "The Pottery" District—my birthplace (54 Lister Street)—is still a relic of such a district staple industry, until Wedgwood's artistic genius migrated it, and most other such local trades, into a single county. "The Groves"—*lucus a non lucendo*—still recalls the sugar trade, in which so many Hull fortunes were lost ; Glass was equally a failure ; Cotton and Flax, Worsted and Carpets,* flourished for a time, but only as textile exotics ; while the adventurous Arctic Whale Fishery trade after existing from 1598, and thus almost from the re-discovery of Greenland by that great Yorkshire navigator Frobisher in 1576, and from being commenced, at Spitzbergen, within four years of the first recorded whale fishing in 1594 has, for geographical reasons, entirely migrated northwards since 1865, though Hull was the first to apply steam to the adventure, in 1857, in the *Diana*. In a Petition to the Privy Council by John Ramsden, of Hull, in

* Floors in the Trinity House are still trown with rushes, in place of carpets, as of old.

1622, he says : " We first found Greenland and gave the first hazard of any Englishman to kill the whale "; but now only interesting relics of the trade exist in the shape of gate-posts made of whales' jaw-bones, of specimens in the museum of the Trinity-House, and in the Fisheries Museum in the Pickering Park, in the signs of old Ale-houses, such as " The Whale," " The Old Whale," and " The Rein-Deer," and in the name of a Yorkshire moor—" Blubberhouses," though this is said by some to be a corruption of Blae or Blue-berries, but the latter may be an euphemism for Blubberhouses. Similar relics may also still exist in some ladies' stays, the value of the whalebone used in making these having been, at one time, no less than £700 per ton.

The sailing of Whalers from Hull—the last, the ss. *Diana*, setting out singly in 1865—was a sight to see, and which I have seen, with their tops and top-mast look-out-tubs dressed with evergreens, as, amid ringing cheers of crowds, they left the Docks for Greenland or Davis Straits, or Baffin's Bay, as did some sixty or seventy each year in the early part of the last century. This enterprising spirit of Hull merchants and men led to the discovery by them of Jan Mayen, or Trinity, Island, and to the establishment of a Hull Fishery there at a very early period, under a grant from James I. A Hull whaler, the *Isabella*, Captain Humphreys, saved and brought home Captain Sir John Ross and his crew to Hull in 1833, after his second voyage to the Arctic Regions in search of a North-West-Passage, an adventure which Captain Luke Fox, a Younger Brother of the Hull Trinity House, had attempted so early as 1631. The association of the Trinity House with Arctic work is indicated by " The Bonny Boat "

in its Hall, a canoe taken up at sea by Andrew Barker, an Elder Brother of the House, in 1613, off Greenland, with an Esquimaux in it, whose very own coat, bag, oars, and mast are still in his tiny craft. A similar example occurs in the Municipal Museum of Shipping and Fisheries.

On the other hand, very many old trades and industries have continued to flourish and expand, notably Blundell's long-established Colour Works, at the corner of the Beverley Road, the makers of the " Brunswick Green " of very early days, and the Cement Works of Messrs. Earle, once and for many years on the Humber Bank, and now on the banks of the River Hull.

Many more new trades have also sprung into existence, while some of both classes have phenomenally risen ; and I make a few observations upon the more important of such local trades, of some of which I may not have already spoken. They comprise Shipping, Deep-sea Fishing, and allied branches ; Marine Stores ; Shipbuilding ; Engineering ; Machinery and Metal Working ; Coal and Coke ; Timber ; Grain, Milling, and Flour ; Seed Crushing and Oil Extraction and Refining ; Colours, Paints, and Varnishes ; Cements ; Chemicals ; Drysaltery, Tallow, Soap, Starch, Ultramarine-Blue, and Black Lead ; Provisions—Meat, Fish, fruit, and Vegetables ; Confectionery ; Brewing and Malting ; Agricultural Seeds ; Tanning ; Building, Brickmaking ; Cycles ; etc.

The rapid rise and subsequent concentration of the steam-shipping business of Hull has been especially remarkable. The former was due to the very early application of steam to navigation on the Humber, whereon, or rather on its tributary, the River Hull, the first steamship was seen afloat in England, built

in 1796, under patent, in Wincolmlee, Hull ; and, secondly, to the quick Yorkshire grip of the economic principles of marine propulsion, and especially of the economical efficiency of the screw-propeller, as compared with the paddle, and of the compound engine. The former revolution was the flood-tide which led many on to fortune, and some to the greatest fortunes. Time was when (I think) Messrs. Thos. Wilson, Sons and Co., and certainly Messrs. Wm. Bailey and Wm. Leetham, owned but a single steamer.* My late friend and colleague in the House of Commons, Sir Charles Palmer, M.P., the shipbuilder, told me how he trustfully agreed to build one of Messrs. Bailey and Leetham's first screw-steamers on credit, relying on the personal security of two able and energetic pioneers of the steam-shipping trade of Hull ; and now, this and other firms, such as Brownlow's—which sent the first steamer seaward to London (1819) and to Hamburg (the *London*)—and Gee's—which first opened steamship communication between Hull and Petrograd (1845, the *Helen McGregor*)†—and Ringrose's, having each done their own work and made their own contributions to the wealth and welfare of Hull, have, in each case except the last, passed under the flag of the Wilson Line, one of the greatest in the whole world in its combined Atlantic, North Sea, Baltic, Adriatic,

* The first steamer of Messrs. Bailey & Leetham was the *Corkscrew*, afterwards the *Jutland* (342 tons, built 1844) ; she was the first screw-steamer which went into the Port of London. In the Museum of Fisheries and Shipping is the figure-head of the ss. *Sirius* (a dog), which was re-boilered in Hull prior to her making the first steamship voyage across the Atlantic.

† The ss. *Emperor* was afterwards on this line, which was absorbed by Messrs. Bailey and Leetham. She was the crack Transport during the Crimean War, and was known as Lord Raglan's Yacht, Lord Raglan being the commander-in-Chief of the Forces.

Mediterranean, and other trades, and enjoying the great advantage of through-rates and Bills of Lading over so many routes; and the "Wilson Line" itself has since ceased to bear that name consequent upon change of ownership. And two very suggestive recent happenings in the Hull steamship trade are that the North Eastern Railway Co. has acquired an interest in certain ships and Continental trades of the Wilson Line, and that the Lancashire and Yorkshire Railway Co. has also obtained Parliamentary powers, and is running its own steamers in the Hull and Continental short-sea-trades, in conjunction with the North Eastern Railway Co.

It may be mentioned incidentally that the first oscillating marine engines were invented by a Hull man, Mr. Witty, and that the mariner's compass, invented at Amalfi, in Italy, is said to have been perfected at Hull, and a Hull ship to have been the first to be navigated by it during a long voyage. Another, but very different, Hull mercantile patent was the first copying machine, invented by Thomas Todd, in 1796.

The following figures indicate the progress of the Hull Shipping Trade:—

TOTAL INWARD AND OUTWARD TONNAGE.

YEAR.		FOREIGN. TONS.	COASTWISE. TONS.
1856	...	1,207,236	... 352,976
1906	...	5,445,450	... 2,349,690
1907	...	6,789,466	... 2,808,044
1908	...	6,067,360	... 2,405,358
1909	...	6,682,109	... 2,547,384
1910	...	7,227,366	... 2,657,870
1911	...	6,720,254	... 2,522,464
1912	...	7,460,752	... 2,626,940
1913	...	8,259,538	... 2,644,527

REGISTERED SHIPPING.

YEARS.	NO. OF SAILING VESSELS.		NO. OF TONNAGE.		NO. OF STEAMSHIPS.		TONNAGE.	
	1856	... 452	50,073	...	62	...	14,096	
1913	...	571	45,671	...	686	...	237,745	

Throughout the series of intervening years there was invariably a progressive increase in the numbers and tonnage of vessels.

The shipping statistics clearly show that Hull is rightly regarded by vast numbers of both export and import shippers as not only in itself a great productive, distributive, and consuming area, but as the nearest and best route for the distributing centres of Europe and Northern Asia, as well as the gate to and from the chief manufacturing and consuming districts of Great Britain.

Little wonder that the attention of the Agents-General of our Canadian and Australian Dominions—who, as one of themselves told me, recently visited Hull with the greatest pleasure and profit—has been attracted by the geographical and other facilities of the Port, and that merchants and shippers in Canada and Australia, and many in South America, should have been induced to make Hull their port of destination and discharge; or that important trade developments between Hull and these progressive communities should be contemplated, both in the Colonies and abroad, and also at home; with a view to which almost every possible inducement, including direct steamship communication, either has been, or is likely to be, provided. One such line, already established, is between Australia and Hull, which has offered, and affords, the best local facilities; and, already, there has been a most marked increase in the imports of wool,

fruit, etc., from Australia and New Zealand, and also the beginning of an export trade in linseed oil and paints and colours with the former. Hull is also establishing itself as a wool-market, for which purpose its port facilities and its comparatively close proximity to the woollen district of Yorkshire give it many advantages, geographical and financial, over other importing centres and markets.

One branch of the shipping trade of the Port, viz., Deep-Sea-Fishing, including its allied industries of ice-manufacture, drying, curing, box-making, the exportation of salt-fish, etc., has vastly advanced since the conversion of the fleet of old sailing-smacks into steam-trawlers and carriers; but an essential condition of its permanent profit and prosperity is a deeper and wider knowledge and application of the facts and principles of the science of marine biology, failing which the increased catching-power, which is out of all proportion to the take, the destruction of immature fish, especially flat fish, and the fouling of the fishing waters by the infusion of oil, petrol, and similar substances, can only end in the decimation of the harvest of the sea, and in reducing the supply of a cheap and most wholesome article of food and diet. I write this from my personal experience, as one long and largely interested in the sea-fishing industry, as Chairman and founder of a most successful Trawling Company at Hull, and as a member of Parliamentary Commissions and Trade Conferences on this most important and urgent national and international subject, for the matter is one which may affect not only trade, but the strength of the best class of the *personnel* of the Royal Navy, and the sooner Governments realise this, as most practical and ex-

perienced fishermen in Hull and elsewhere have already done, the better for the people, and for the true welfare of one of the hardest and bravest classes in the community.* Many thousands of people in Hull are, directly or indirectly, dependent on this great national and local industry. Owing to the causes I have mentioned, the North Sea has already become much depleted, and now, our fishing vessels have to range as far south as the coast of Portugal and northwards to Iceland, and into the Atlantic off the West Coast of Ireland. The City's earliest wealth came from fish, which, in days when "Hull waxed very rich by trade," were brought from "Isleland," and exported as dried and hardened "Stokfisch" to Ireland, "to be eaten instead of bread," but, probably, for religious reasons, chiefly on Fridays. The Hull streets were at the same time paved with cobble stones, shipped as ballast in these vessels carrying light cargoes of "stock-fish."

Shipbuilding, Engineering, and Machinery and Metal Working have made great advances during the last decade, notwithstanding that Hull shipbuilding has always laboured under some differential disadvantage owing to its greater distance from the iron and coalfields than that of its northern competitors. Wooden shipbuilding has decreased, and this, together with the increase of carrying capacity in nearly all modern vessels, reduces the rate of increase in the total number of ships launched; but, formerly, the

* In the days of peace the Steam Trawlers were universally referred to as the "lifeboats of the North Sea," on account of the very large number of rescues they effected, under conditions demanding the utmost bravery and endurance of their crews, the story of whose gallantry and daring as mine sweepers, etc., in the present war, will, when it comes to be told, be one unsurpassed in records of heroism.

Humber was the great northern shipbuilding centre for the oak-built ships of the Royal Navy, many and large ones having been constructed at Hull, and on the Humber at Hedon, Paull, and Hessle Cliff, and the smaller classes of home and foreign iron or steel warships are still built at Hull. An 80-gun ship was launched at Hessle Cliff in 1693; fourteen warships at Hull between 1730 and 1815; and the line-of-battle ship *Anson*, at Paull, in 1810. One notable ship, *The Bessemer*, was built at Earle's Shipbuilding Yard, Hull, from designs of my old friend the late Sir Edward Reed, except as to the "Swinging Saloon" invented by Mr. Bessemer himself, in order to abate sea-sickness. I was on board at the trial trip, but "Bessemerism" aggravated, perhaps, on that convivial, no less than scientific occasion, by profuse hospitality—proved a failure.

The old-established Hull Timber Trade is great and increasing, imports having advanced very considerably during the last twenty-five years; the Hull market is one of the largest, most varied, and well-stocked in the world; about eighty firms are engaged in the business; while creosoted poles, sleepers, and other wood-goods are comparatively new developments, as is the importation of wood-pulp and wood-pulp-board for local paper and stationery works. In former days, timber imports were chiefly from the Baltic and Quebec; now such cargoes, and especially pit-props and mining-timber, come from many parts of the world. Recently I saw large quantities being shipped for Hull from the Lower Danube, Roumania, and the Carpathian Mountains; and, when last in Hull, a suburb of Ottawa, Canada, I observed not only consignments of timber for our old Hull, the parent City, but trees from the

forests of Messrs. Eddy, paper makers, etc., enter their works and come out as wood-pulp paper, and as most excellent matches—boxed, brimstoned, and labelled ready for sale. This is chiefly the result of the great water-power at the service of Canadian manufacturers, a source of energy, which, in combination with the dynamo, will give some British Dominions and other countries a great competitive advantage over us, unless we can invent a really cheap and effective power-gas, or be able to harness the tides to the dynamo for the generation of electric energy, by overcoming the difficulties of the intermittency of the source of power, of the storage of the energy developed, and of the cost of the necessary mechanical appliances; and, as in the case of the Severn at Bristol, I suggest as an eligible site, our River Hull—the Old Harbour—in which to apply, and test, the economic efficiency of tidal power for this and other purposes. Vastly increased railway and dock accommodation and facilities, including railway wagons, bogies, etc., have been provided for this trade. Facilities should not follow, as too often, but must often even precede, and so create, demand. No doubt the opening for traffic of the new dock will not only meet the needs, but lead to still further extensions of the Timber Trade.

As has been already said, one of the very oldest industries, almost the only surviving staple-trade of Hull, and the one of which it is the chief seat, is Seed-Crushing, together with the allied industries of Oil-extraction and Refining, and the Manufacture of Feeding Cakes. This most important local business is the successor of that of Arctic Fishing and the Manufacture of Whale Oil; the modernized mills, machinery, and plant mostly occupy the same sites

as the older ones ; but the newest crushing machinery and inventions have been applied. Hence the trade has seen very great expansions ; it now includes the production of castor-oil and soft and other soaps ; and, altogether, utilizes a very large capital and gives great employment. Of this industry, Hull is the unrivalled trade-centre, the Port having been long and generally recognised as specially adapted to the importation, and manufacture into cakes and oil, of linseed, formerly brought chiefly from Russia, but now mostly from the Argentine, and from our own Colonies and Dependencies ; of cotton seed (largely from India and Egypt) ; and rape seed ; also of carobs, etc., for cattle foods, from Cyprus (where I have seen the value for these purposes of the tree-growing " locust beans," with their rich saccharine constituents), and other sub-tropical localities. This staple trade was originated between Hull and Russia, probably in the fifteenth century—in 1400 seed-oil was imported into Hull and was one chief cause of the commercial mission of the first Ambassador from "The Emperor of Muscovy" to England, Osep Napea, who came to Hull en route for London, in 1577, in order to establish commerce between the two nations. The seed-crushing trade is largely the subject of an Association or Combine which includes Hull and other places. The export of Linseed Oil from Hull in 1913 was 7,545 tons (including 2,713 tons to Australia), of Cotton Oil 5,000 tons, and of Soya Oil 6,761 tons, 3,348 tons of the latter going to Italy. The Agricultural and Horticultural Seed Trade also flourishes in Hull, the latter a survival of the Hull Botanic Gardens, of which I was Chairman.

An old and great industry, now carried on chiefly in the same neighbourhoods as Seed-Crushing, is the

Manufacture of Oil Paints, Colours, and Varnishes ; as also Coal Tar and Resin importation and distribution. It is greatly to be regretted that so much of the industry in coal tars and their by-products for the manufacture of dyes and colours, first invented by our great chemist, Perkin, and long carried on at Huddersfield, has migrated to Germany, largely owing to our defective education in the application of science to industries, both in our works by skilled chemists and scholastically, and that our imports have thus been enriched at the expense of home work and employment. The war with Germany has disclosed our unenviable and dangerous position in regard to this industry in both peace and war : hence the proposed schemes to aid in the establishment of works on an adequate scale in England (Huddersfield) and allied or friendly countries. The Reports of the Parliamentary Committees on this subject should be read and re-read, and acted upon.

Tanning (and the dressing of hides and skins, which are greatly imported into Hull) is also very largely seated in Hull.

One notable feature of new local industries is the manufacture of Cycles, as carried on at Barton, a trans-Humber suburb of Hull.

Lastly, the Building Trades are an essential industry of Hull, and, in this, the City enjoys many natural advantages. The Estuarine brick-clays of East Yorkshire and Lincolnshire are exceptionally suitable for building-construction ; stone is easily and cheaply transported from the West Riding by water carriage and by rail ; timber is largely imported ; while the best cement has long been locally manufactured on the two rivers' banks. Probably owing to some of these causes, Hull was, as has been said, the first town in

Britain to revive (*temp.* Ed. II.—Rich. II.) the art of tile and brick making and building in brick; its fine old Parish Church of The Holy Trinity is chiefly of brick, the Transept being the oldest brick building (not Roman) in Britain, and the "Decorated" work throughout is the most important example of fourteenth century brickwork remaining in England.

Almost the same may be said of the ancient and picturesque Grammar School, which educated Andrew Marvell and Wilberforce, of the former palatial house of Sir Michael De-la-Pole, and of the Town Walls, Towers, and Gates; and, though quite the same eulogy cannot literally be spoken of Modern Hull as by Augustus Caesar of Ancient Rome—that he found it of brick, and left it of marble—still, as compared with its previous condition, Hull has recently been as vastly changed and improved by good modern brick-work.

To conclude, having written of what Hull was, and what it is, let me ask—What is it to be? Of its permanent primacy among North-East-Coast Ports there can be no question; physical causes gave this and have kept it, intellectual and moral ones have safeguarded and will guard it; municipal patriotism and public and private enterprise, largely inherited, will develop and extend it.

In old trades and industries there have been survivals of the fittest; many new ones have been introduced, and the advent of others is assured; and, in each class, there is every prospect of great developments.

The City and Port is being rapidly improved. A dredged, deepened, and better-scoured river-channel is, in large part, already semi-canalised by successive embankments of the foreshore; and these will, at no

distant day, extend from Hessle to much beyond Marfleet—a distance of 8 miles or more, and even beyond the ancient Port of Paull (some two or three miles below Marfleet)—indeed, a Quay at Sunk Island, some miles still lower down the Humber, has already been proposed by a Bill in Parliament—and is to be faced by jetties, quays, and pontoons; already the North Eastern Railway Riverside Quay, south of the Albert Dock, and the River Pier of the Hull and Barnsley Railway Company, have revolutionised the traffic in the Humber, enabling the quickest despatch to be given at any state of the tide and tremendously facilitating the passenger services. The new King George Dock and its jetties, and the oil jetty at Saltend, will now enormously add to these facilities.

The long-standing proposal of filling-up and converting into Boulevards the sites of the old docks—which mark the lines of the still older Citadel moat and the Town's wall and gates, the first dock (now “The Queen's,” which is said to have been, and probably was, the first enclosed commercial dock in Great Britain), having been made in part from the moat in 1778—has probably been postponed for a time by new and improved bridges and approaches, but is sure to be revived, as will also the even more interesting problem of the future of the Old Harbour, or Estuary of the River Hull, which is still a chief trade artery of the city, lined by mills, warehouses, and yards. Its probable destiny is that it will ultimately be closed by a barrage, with one or more locks, and be converted thus by dredging into a canal-dock. Closely connected with the future, and, indeed, with the very present, of this river is the question of freeing the South Bridge, a necessary link between the west and ever-growing

east of Hull, but too long an obstacle, the removal of which ought not to be delayed by the Corporation, in the public interest and convenience, by any undue consideration of a particular railway company, which ought, however, of course, to be compensated for any real loss it may sustain, a thing which is anticipated, and provided for, by the South Bridge Act. The Citadel site is bound to become more than a mere place for timber storage, and was proposed, by a Bill in Parliament in 1859, for the construction of a dock by the old Dock Company, of which I was a Director.

These, and many other things, of which Hull may be patriotically proud, have been, or soon will be, accomplished by the foresight, energy, and public spirit of Hull men, manifested in the past by a wise King, a progressive Municipal Corporation, and a great and enterprising Business Community, and what of them is still left undone constitutes a duty expected to be done by growing and prosperous generations. Possibly, some very early one of these may even see the accomplishment of a Sub-Humber Tunnel connecting Hull directly with the South, a Bill for which I was one of the promoters, and which was thrown out by the vote of a single Peer.

But, whatever may be achieved, the brightest and best of the jewels in the three Crowns, the Civic Arms of Kingston-upon-Hull, and the leading light for its future advancement, consists not in its royal foundation, not in its kingly name, not in its past history, traditions, and triumphs, great and honourable as these have been, but in the continued fulfilment of that private and public duty which is the chivalry of the age in which we live; in the patriotism, zeal,

enterprise, and industry of the citizens of what is indeed no mean city; in the high policy, right government, wise and pure administration, and the sound education of the people, through the Municipal Corporation, that the citizens may live noble lives and earn honest and honourable livelihoods in the dignity of their labour; in the well-ordered and peaceful organisation of trade and industry by the Municipal Council, by its long-established and able Chamber of Commerce, and by the Trade Societies, of both employers and employed, working in harmony, so as to make the very most and the very best of both the capital and labour of the citizens of all classes in their daily lives—for Commerce is Peace and Peace is Commerce—then shall the day inevitably dawn when, in all things, the right of force shall be supplanted by the force of right, that blessed day of peace on earth and good-will toward men, in the full light of which shall

The sheathed sword fall,
And Peace, an Angel, fold her golden wings.
And Commerce, smiling, call.

The above epitomic sketch of the origins, rise and vicissitudes of Hull's Commerce, Shipping and Staple Trades and Industries, was originally written as the Introduction to the first volume of an official publication, *The Port of Hull Annual*, which has been revised at the request of the Secretaries of the British Association's Annual Meeting at Hull, this year, 1922. It remains to add a few words on the material influences and modifications which must follow the recent Act of Parliament, geographically grouping the local Railways. Leading features, in which are the practical elimination or limitation of the stimulus of competition between the Railways *inter se* and between themselves

and the communities who are their customers, and the adoption of a right and righteous Railway Policy is absolutely necessary in the interest, not only of the Railways and Docks, and their shareholders, but also in that of the City and Port and the public in general, and it behoves all of these at once loyally to unite in the provision of the most economic, efficient, and up-to-date transport services for the maritime and commercial development of the towns and districts which they traverse, and in which they enjoy statutory powers and privileges, which must not be unduly restricted or abused by monopolist organisations. These bodies must therefore give in return to the commercial constituents the full and fair share and benefit of the geographical position, the natural resources and local advantages which they respectively enjoy, and I was glad to read that this concept of public duty and interest was realised, and its fulfilment promised, by an official spokesman of the Grouped Railway and Dock Companies at the recent Dinner of the National Press Fund held in Hull, the invitation to which the writer was sorry not to be able to accept. And it is, of course, to be borne in mind that any default or defect in the Companies' statutory obligations is safeguarded by the Tribunal set up by the Act, a security which is additional to the fact that what is the statutory duty is also the interest of all concerned, including the Railway and Dock shareholders themselves. And the official attitude of the Companies is at least hopefully foreshadowed by their having already indicated certain reductions in their freight rates for merchandise trains and in their fares for passengers.

On such lines, and on such lines only, grouping

may successfully abolish some admitted disadvantages of wasteful competition, while the advantages of Hull's exceptional position, and the energy and enterprise of its manufacturers, merchants, shipowners, tradesmen and men of business and affairs will be recognised by reasonable Railway and Transit and Dock and Canal Rates and Charges, and by full facilities, and thus the future of the City on the Humber and the Hull should be even more assured than in the past, and as worthy of the old names in its history—the Marvells, the De-la-Poles, the Wilberforces and other pioneers in the past, and of the even higher and better years and centuries to come.

PLACES OF INTEREST

THE CHURCH OF HOLY TRINITY

IN the Market Place is the Church of Holy Trinity, one of the largest Parish Churches in England.

It has witnessed many vicissitudes, once (*temp. 1522*) being under a severe interdict. No worship was to be performed in it, and those who entered its precincts were declared to be "accursed." In 1537, the Corporation, fearing that otherwise it might be taken from them by King Henry VIII., then plundering his subjects right and left, sold their plate, and applied part of the proceeds to the reparation of the Church. It is also recorded that during the Commonwealth part of the Church was allotted to the Dissenters, who brought over an "Independent" preacher from Amsterdam. A wall was built to divide the congregations. The "Independents" wantonly defaced the monuments and inscriptions, pulled out most of the brasses, and otherwise "spoiled" the Church. Although the edifice only became a Parish Church in 1661 (having previously been a Chapel-of-ease to Hessle), the fabric dates back to the thirteenth century. It is cruciform in plan, with a noble square tower rising from the intersection to a height of about 150 feet. The Church is about 279 feet in length, and its greatest breadth is 96 feet. The breadth of the Choir is 70 feet and that of the Nave 72 feet. It covers an area of 25,640 square feet. The Chancel is early English in style, and constructed of brick, but the Nave, in the

Perpendicular style, is of stone. The lower portion of the tower is part of the original structure to the height of a few feet above the roof of the Church. A very fine view of the City and the Humber is obtainable from the summit of the tower.



THE CHURCH OF HOLY TRINITY, SHOWING THE GREAT
WEST WINDOW.

The West Doorway is of very elaborate workmanship. The mouldings are enriched with flowers, and rest on nine slender columns with foliated capitals. Above is a pedimental canopy, ornamented with trefoiled cusps, a crocketed label, and ending in a finial. On each side are three tall niches with rich canopies, and above, the great West Window of nine lights, occupying the entire breadth of the Nave, reaches

to the parapet. Over the window is a full-sized statue of the Saviour in a sitting posture, the right hand raised in the act of blessing, and the left holding the orb and cross. This figure was placed in position in 1863.

The East Window is of seven lights, having the sweep of the arch filled with quatrefoil and cinquefoil tracery. There are several stained-glass windows, but the Church is not rich in this respect. There are a number of Chantry Chapels, now for the most part used as vestries, etc.

To the south of the Chancel is the Broadley Chapel containing the Broadley Tomb, surmounted by an effigy and canopy. It is very probable, judging from the armorial bearings which appear on shields in the Chapel, that this was the one founded by the De-la-Poles. Not far away, and nearer the East Window, are recumbent alabaster effigies attributed to Sir William De-la-Pole and his wife. Sir William reclines bareheaded, habited as a merchant, in a mantle buttoned close at the neck. He wears a dagger, and at his feet reposes a lion. His wife wears the mitred head dress, gown and petticoat. In her hand she holds a heart, and at her feet is the figure of a dog.

Some have said that these effigies represented not Sir William De-la-Pole, but Sir Michael De-la-Pole, the first Earl of Suffolk, and his wife Catherine, daughter of Sir John Wingfield. The Earl died in disgrace in Paris in 1380 at the age of fifty-five. It is suggested that his body was brought to Hull and entombed in the Chapel of the Charter House, and that the monument was eventually moved, at the dissolution of monasteries, to the door of the Chantry founded by him. It is said that an examination of the ground

beneath the effigies revealed the fact that no human remains were there.

There are numerous other monuments and memorials in the Church, the oldest of which is said to be one in the floor of the south aisle of the Choir, near the east end, of Richard Bylt, alderman and merchant of Hull, and his wife. The former died of the plague in 1401.

Other worthy names and families commemorated here include those of Alderman Ferres, the Maister family, and members of the families of Hollingsworth, Somerscales, Stubbs, Sandwith, Shipman, Harrison, Skinner, Gleadow, Porter, etc.

The Church and its oak-tree foundations have recently been thoroughly overhauled, restored and strengthened. The interior aspect of the fabric is exceedingly fine. The ceiling of the Nave is panelled, flat, and embellished with stars on a blue ground.

There is a peal of ten bells, and chimes are played at certain hours. A sixteen-sided Font is a noteworthy feature, and there are several richly-carved Memorial Screens. Before the restoration in 1833, the East Window was blocked up by a quaint painting on plaster, executed by one Parmentier. This strange piece of work is still to be seen in the Church. It is supposed to represent the "Lord's Supper." There is a fine organ by Forster & Andrews, of Hull.

The Church seats 2200 people. The ancient Parish library once lodged at this Church has been transferred to the Wilberforce Museum.

ST. MARY'S CHURCH

This Church was originally the Chapel-of-ease to North Ferriby, and there is no record extant of any formal separation. The earliest record we have of

the Church is contained in the will of William Skayl, dated 1327.

In 1518 the west end of the edifice collapsed, and we read that in 1540 King Henry VIII. "pulled down the body of the Church and the steeple, as it intercepted his view from the palace" (Suffolk Palace, which stood just opposite). The materials were used in the



ST. MARY'S CHURCH.

building of fortifications, and only the chancel was left standing. This was eventually converted into a Church, and so it continued until 1588, when three intercolumniations were made to the east of it. This newer work is easily distinguishable by reason of the lighter form of the arches. For more than a century after this it continued without a steeple, but in 1696 the foundations of the present tower were laid, and it was completed the following year. The height of the tower is 106 feet.

In 1860-3 the Church was thoroughly restored, and

a new aisle added, together with a porch and vestry. The tower was also pierced for the convenience of foot passengers, the street here being very narrow ; indeed there is every reason to think that Lowgate originally passed round the east of the Church, which would not, before the addition of the three eastern bays, extend so far in that direction. There are about sixteen beautiful stained-glass windows, a decorated reredos of stone, and a fine porch. The restoration was carried out by Sir Gilbert Scott.

St. Mary's has a peal of six bells, first hung in 1727.

The churchyard, before the restoration and enlargement of the Church, extended into what is now part of the street, and was raised some feet above the roadway.

Above the north door is an alabaster monument in memory of William Dobson, merchant-adventurer, twice mayor of Hull, who died in 1616, an ancestor of the Sykes family.

In and about the Church are also memorials to Sir Samuel Standidge, who died in 1801, to the Rev. J. Scott, and to the Thornton family. Other memorials and stones record the names of the Blaydes, Bolton, Haworth, Cooper, Hodgson, Kay, Thompson, Fawsitt, Harrison, etc., families. A curious sepulchral brass is inscribed to John Haryson, mayor of Hull in 1537, who died in 1545.

THE HULL GRAMMAR SCHOOL

The history of the Hull Grammar School conforms to that of grammar schools in general, in that it had its beginning in connection with the local church, and that the date of that beginning is unknown. It was associated with Holy Trinity Church and

attached to one of the major Chantries, that of St. James and St. John.

Holy Trinity was a chapel of Watton Abbey, and may be presumed to have been founded before Meaux Abbey came into possession of the town site and district, which is reckoned to have been about 1160. At some date and for some reason, both yet to be ascertained, the church was transferred to Gisburn Priory, and appropriated as a chapel to the Church of Hessle. The date of transfer cannot be earlier than towards the end of the thirteenth century.

It was thus continuously in the hands of Austin Canons, is considered to have been collegiate, and has some record of town chantries in the thirteenth century. Therefore, an early School, with division into "Song" and "Grammar," may be admitted to be certain.

The town of Wyke, which became Kingston-upon-Hull, and was, by association with the river-haven, already styled "Hull," had *Gilda Mercatoria* in and from 1226.

There are no early references to the School. A lane, mentioned in 1347, abutting on the church precincts, was called Scole Lane, and near it was also Scole Street. The first mention of the institution itself occurs in 1405, when John Rotsea, Chaplain of the Chantry of St. James and St. John, and Master of the Grammar School, is granted by the Mayor and Commonalty of the town a rent-free house. This may have been an existent custom. The supposition is that the Singing School (for the Church services) was held in the Chantry chapel, and the Grammar School in the rent-free house. The Corporation had many houses, trust endowments of chantries, but other than

the Master of the School, all town officials who lived in any of them paid rent.

In 1454 came a period of lay Mastership. The rent-free house continued. The Master was now yearly granted an expensive gown, as in the case of several other officials ; it was of half velvet, and his first one was green. The Corporation fixed his emoluments ; he was to take from each scholar in Grammar (*ad gramaticum* and in *Alphabetes et graciis*) 8d. per quarter, and from every scholar in reading 6d. per quarter.

In 1459, the Alderman agreed that in addition to his gown and tenement, he is to have from the Town a yearly salary of 26s. 8d. He also at various dates had a gift of money, not always of the same amount, on Christmas Eve.

In 1477 and 1483, John Alcock, Bishop of Worcester, of a Hull merchant family, obtained two several licences for chantry mortmain, up to £20 annually. The pious works mentioned, no doubt, was the making of the Grammar School a Free School. Apparently the School was taken over by the Bishop's nominee, the Chaplain and Master, in 1483, when the Bishop visited Hull and was entertained by the Corporation.

The then Master was made the Common Clerk of the Town, and the then Common Clerk was made an Alderman.

But the School continued to be held in the rent-free house. In 1486 the Corporation gave the Master 23s. to repair and extend " the Scole."

It is to be noted that the information of this article up to 1483 is now for the first time in print. In the haste of the earlier historians, they missed everything prior to Bishop Alcock's pious work.

The Song School, no doubt, continued to be held in the Chapel of St. James and St. John until 1483, when it would be held in the Chapel of the Trinity, St. Mary and St. John (the Bishop's Chantry).

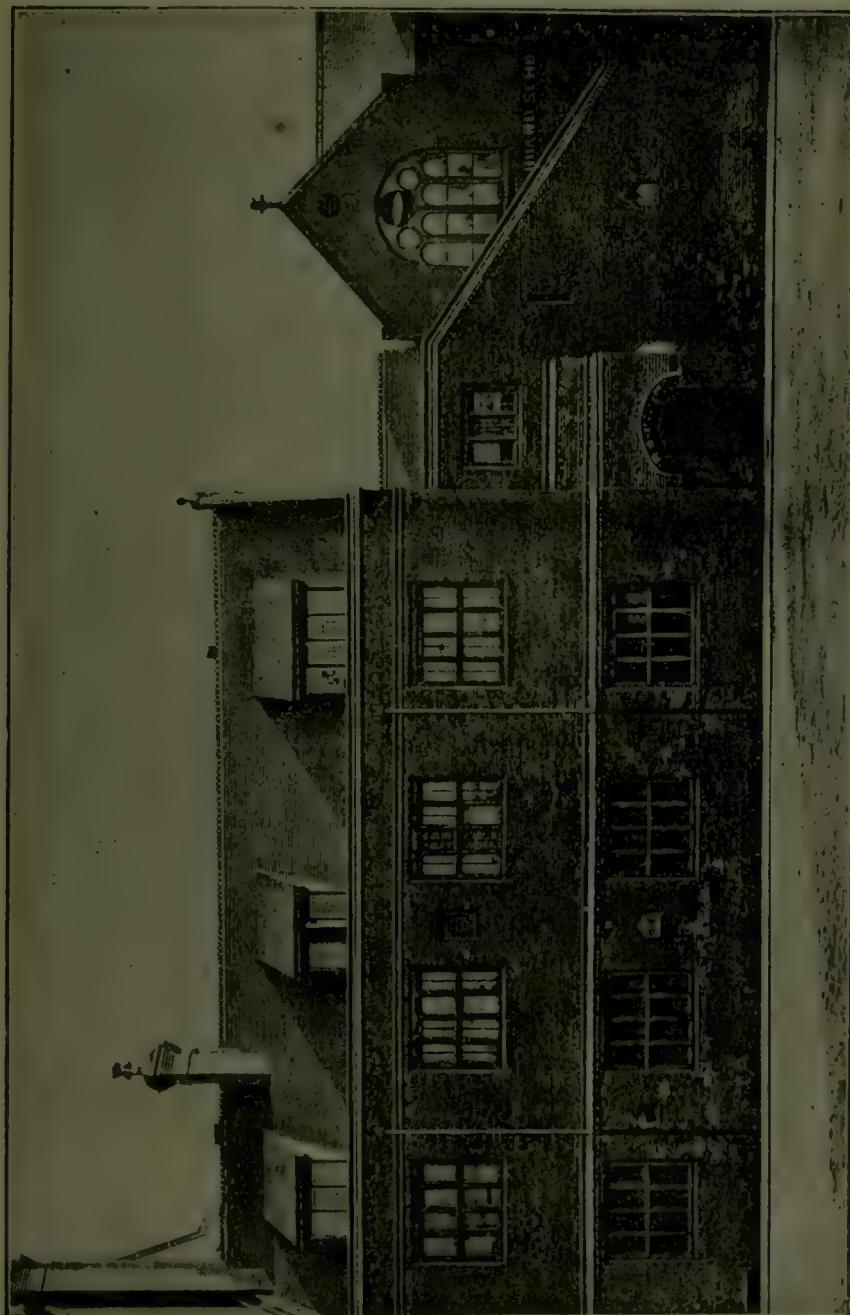
The Chapel of St. James and St. John the writer fixes as being on the east side of the porch of the South Transept, in which porch a built-up doorway is to be seen.

The Bishop's Chapel was the third Chapel from the east end of the Chancel, on the south side, and its site can be identified by an external door. These external doors, unusual for mass chapels, are, it is argued, the mark of usage for schools.

In 1499, the Bishop, then of advanced age, formulated a Deed of Foundation, declaring the Chantry Chaplain to be the Master of the School, and that the scholars are free from the payment of fees. Moreover, ten of the best scholars are to have half a mark a year, which may cover a scheme for some of them proceeding to Cambridge. This so long as the funds admit; if they fail, deficiency is to be made up by the Mayor and Vicar. Nothing further appears as to this obligation. The Singing is to be taught by the Parish Clerk, who is to have £2 a year on that account. Probably all this was anticipated in effect from 1483.

The Bishop built a School upon a block of ancestral land abutting on the Churchyard. The date of the Foundation Deed was probably the year the school was opened.

This 1499 deed, itself missing, is only heard of in 1545, when it is quoted in resumé by the Commissioners who surveyed the Hull Chantryies.



THE OLD GRAMMAR SCHOOL.

In 1548, the Commissioners of Edward VI., on the same quest, found several variations in the returns, minimising values ; but in the case of Alcock's Chantry and School, there is an increase. The School was suppressed along with the Chantry, but re-established, apparently, in the same year. But, however short the interval, there was time for some Crown representative secretly to sell the garden attached to the School, and the use of which was a perquisite of the Master. It was bought by Thomas Dalton, one of the Aldermen. As another adjoining piece of land was rented (in 1565, as related by the uncertain historians, who erroneously say it was bought) from the Vicar, no doubt Dalton took possession.

The Crown, in restoring the School, allowed the Master in perpetuity the yearly payment of the last credit balance of the 1548 revenues, viz., £13 2s. 2½d. In modern days this amount, coming by way of the Commissioners of Woods and Forests, has an official paring taken off it. Rent charges such as the above have been regarded as immoral by the Crown, when beneficiaries have been subjects. Should the Crown ever decide to surrender in favour of the School, it will have a very exact basis of calculation in the detailed rentals attached to each of the two Surveys mentioned.

William Gee, a rich Elizabethan Alderman, began a movement for a new School building. The historians say he commenced in 1578 to gather public subscriptions. He himself is stated to have given 20,000 bricks and £80. In his will, 1600, he says he " builded " the School ; he also left it two houses. In a petition for a Town Charter in 1610, the Corporation states it built the School at a cost of £600. Probably all the statements, modified, and if they could be analysed,

make up one truth. The Corporation added the upper storey for Merchants' Exchange and Assembly Rooms.

The School was no longer free.

The new School was practically finished and began its career in 1584. In 1587 the Crown grantees of



THE OLD HULL GRAMMAR SCHOOL, BUILT IN 1583.

"Concealments" (in a successful attempt to squeeze a little more money out of ultimate owners of endowments), passed the Old Schoolhouse, the New Schoolhouse, and the garden to a body of Trustees, viz., the Aldermen of the particular date. It was a sort of tontine trust, except that the last surviving Alderman, instead of getting anything, had to transfer the Trust to the body of Aldermen existent at *that* particular

date. This occurred three times, but the trust in that method appears to have become ignored in the time of Charles I., and the Aldermen, quasi Corporation, regarded as the feoffees.

The specious nature of the Concealments procedure is well exemplified by inclusion, in the grant of restored concealments, of the New Schoolhouse, built during the negotiations.

A further piece of cynicism seems to lie in the fact that in 1583 the Corporation bought, or otherwise received by grant, from Thomas Dalton, the garden he bought 35 years earlier. Until the matter can be better examined, it is impossible to say whether he were a patriot or merely enterprising.

The ecclesiastical hand did not become nerveless after the Reformation. In the Town Charter of 1610-11, it is provised that the Master shall be tested and approved by the Archbishop of York. The same applies to the office of the Lectureship of Holy Trinity Church. This latter was or became the Senior Curacy, and was the usual adjunct of the Mastership. The Corporation paid the salary of the Master from, at any rate, 1583, viz., £39; in 1800 it was £65.

The details of the School history in the seventeenth century (additional to those noted), and in the eighteenth, are numerous and interesting, but, upon the whole, somewhat domestic.

The Old Schoolhouse was converted into a residence for the Master. There must have been a space between the Old and New buildings, both on the street frontage (South Church-side); for in 1626 the garden was used for parking the Town's Artillery.

In 1720 the Master's house was rebuilt by subscription.

In 1779 two residences were erected in its place, filling up the entire frontage of the block. Both were rent-free houses, one for the Master, and the other for the Reader of Holy Trinity, who was the Junior Curate.

All inquiry fails in finding what became of the latter, the easternmost house, after 1835, when under the Act of 1832, the Reader lost his house and a stipend of £20.

In 1835, when the Reformed Corporation began its career, a body called the Charity Trustees, the nature and details of whose appointment are not on record, took control of the School building, while the Corporation remained governors of the institution, a division of responsibility which proved extremely disastrous.

Under the Reform Act of 1832, the Master lost his salary but retained his rent-free house. A layman, Mr. John Sollit, undertook the Mastership without salary, but with the Crown £13 2s. 2½d. grant, and what he could make in rent out of the upper storey of the School, and a tiny shop under the stairs. It was generally supposed that a cobbler could live in the confined quarters of a Diogenes; this shop filled all Hogarthian requirements. The upper chambers were let for a writing-school, which doubtless included all the subjects beneath the dignity of *Alphabetis et graciis*.

Mr. Sollit made a success of the School, and £200 per annum profit for himself. He was probably the first Master who was not a University graduate. Upon his death in 1868, the ancient office, established in 1578, of Usher of the School, the Master's Assistant, came to an end.

The next Master was the Rev. George Ohlson, a graduate of Paris, precentor of Holy Trinity, who was also successful in attracting large numbers of pupils. But bad times came for the building, which, in the

National Gazetteer (1868), was declared to have the best schoolroom in England.

The Charity Trustees had no funds for repair, the Master was adverse to more than ordinary expenditure and had the promise of a better post, the Corporation was sympathetic but legally helpless, the Crown was ignorant of the situation to which it held the key, and the public and public men were individually apathetic. The Charity Commissioners, in a chorus continued for years later, urged the desirability of getting some endowments !

The building was abandoned, the last school-day there being the 15th November, 1878.

When it was left it was much as William Gee left it. The writer, about 1880, made drawings of its four rooms ; though the building was much time-worn, there was nothing vitally wrong.

The Grammar School went elsewhere. After an infinitude of negotiation, it secured a permanent home built as its own. The prestige of its ancient name doubtless helps it to flourish. Perhaps Bishop Alcock looks sadly on, and thinks how much better it would be if his money were liberated.

In 1882 the Charity Trustees sold the whole site of the old School for £5000 for trade purposes.

In 1883 the School building and a strip of the playground were purchased for £2300 raised by the Vicar in public subscription, in his appeals being greatly assisted by the Archbishop of York. It was converted with ease into a Choir School and Clergy House.

The public considered that the venerable building was thus permanently saved to posterity : yet it is said that a new threat against it, made within the last few years, is not yet averted.

THE HULL TRINITY HOUSE

In Trinity House Lane is the compact but extensive block of buildings belonging to an Institution of which Hull may well be proud. The Guild of the Hull Trinity House, the records of which are older than those of the Hull Corporation itself, was founded on the 4th June, 1369, as a religious fraternity. There is reason to believe, however, that prior to this a Shipman's Guild was in existence. These ancient Guilds appear to have amalgamated at some time, and in 1457 reference is made to the establishment of "an house of alms" in Hull for poor mariners.

The Corporation of the Trinity House possess no fewer than ten Royal Charters, and from time to time important maritime duties have devolved upon the Brethren, who have always loyally fulfilled the trust reposed in them. The benefits which result to the seamen of Hull from this magnificent foundation are many.

The Corporation consists of twelve Elder Brethren and six Assistants, and an unlimited number of Younger Brethren. From the Elder Brethren two Wardens are chosen annually. The Guild has at various periods enrolled as Honorary Brethren distinguished personages, and have the high honour of including in the list his present Majesty, who was admitted when Prince of Wales. The House has, by statute, six representatives on the Humber Conservancy Board, such representation entailing considerable Maritime and Pilotage duties on those members of the Guild who are chosen to serve on that Board.

Alderman Ferres, an Elder Brother and Warden of the Guild, was its principal benefactor, he having

purchased the entire site of the White Friars or Carmelite Monastery, and bestowed it, in 1621, upon the fraternity.

The Trinity House occupies the ground originally acquired from the Carmelite monks in 1457, and the present buildings were erected on the same site in 1753.

"To enter the precincts of the Trinity house," says the Rev. R. H. A. Currey, "is to pass at one stride from the atmosphere of the twentieth century to that of the eighteenth. As its swing doors close behind one, the din and rush of modern traffic dies away into sudden calm. One forgets for the moment the roaring winches and feverish bustle of the neighbouring docks.

"From the office where the business of the Trinity House is transacted it must not be forgotten that the Trinity House is essentially a business body having administrative duties and ramifications of great importance and responsibility, though not the far extending executive duties of earlier days a long curved passage leads the visitor to the inner recesses of the building. On one side lies a series of small rooms, which were at one time occupied by the sailor pensioners, but which were long since vacated on their removal to more commodious quarters. Upon the other the gallery is lit by windows looking on one of the quadrangles which lie snugly hidden from the outside.

"Two or three steps bring one to the 'Hall.' From the ceiling hang Esquimaux canoes of wood and sealskin, prominent among them being the famous 'bonny boat,' picked up at sea by an Elder Brother at the beginning of the seventeenth century, with the owner dead from hunger and exhaustion. The only materials used in the construction of this canoe, or

'Kyak,' consist of sealskin and walrus-bone ; but so perfect is the workmanship that the paddler could be overset in his craft and hang suspended head downwards without shipping a drop of water, while a single stroke of the rude oar sufficed to restore his equilibrium.

"An ancient implement above the chimneypiece is the axe which in days gone by was the harbour master's badge of office, and with which he cut the cable of any vessel which disregarded his orders.

"A broad flight of steps leads to the apartments on the upper floor. On this staircase hang various pictures, one of the most notable being a portrait of Captain Cook. Long-forgotten sea-fights are dimly distinguishable in mists of cannon smoke ; a Hull, on which our great-grandfathers may have gazed, flashes back the sun from a yet unpolluted Humber. Immediately in front of the stairhead is the model of a whaler, from which some idea may be gained of the solidity of the wooden walls that braved the perils of the frozen seas. Indeed ships' models abound in the Trinity House. To the left of the landing is the Council Chamber, where the Brethren meet to transact their business. Valuable chairs are ranged around the long table, with one at the head of more dignified dimensions occupied by the Acting Warden. The most notable feature of this room is the floor. It is of bare boards, without any carpet or rug. But it nevertheless has a covering, which has been maintained from a very remote period, for this floor is thickly strewn with rushes, renewed at intervals. This custom has not been departed from since the Brethren possessed either a Council Chamber or a history. An institution which began life somewhere in

the Dark Ages as the Shipman's Guild, became the Trinity Guild in 1369, was created a Corporation by Henry VIII, at the time when other Guilds were being ruthlessly swept out of existence, and was assured by King Charles II, that it had been so well governed that 'it has much tended to the furtherance of navigation, the increase of shipping, and the well-breeding of seamen in the Town and Port of Hull,' can afford to thus observe its traditions and ancient usages.

"The Court Room is on the opposite side to the Council Chamber. It is an apartment of some magnificence, and somewhat recalls the splendour of the sister guilds, the London City Companies. It is lighted by large and lofty windows facing east and west. Above the western window is painted in gold a ship which has the peculiarity that, when one walks across the room with eyes fixed upon it, the vessel appears to swing completely round. The optical illusion is remarkably perfect. Two models here are remarkable in their different ways. The one is a full-rigged ship, with guns, fittings, blocks, complete, the hull and the masts of which are composed of bones, clean picked, and afterwards shaped by the French sailor war-prisoners. The standing rigging is made from hairs plucked out of the long pig-tail then in vogue amongst seamen, and the paint is lamp-black. The bits of metal which form the guns were picked up wherever they could be found, and out of such unpromising material did these artificers build up a fabric perfect as to lines and proportions, and to all seeming as capable of taking the water as any product of the boat-builder's art. The other is known as 'Queen Anne's yacht,' a marvellous example of delicate finish, and one well illustrating the transition stage

between the Tudor and Stuart methods of construction, and that which continued in vogue until a quarter of a century after Trafalgar.

" Two portraits adorn the walls—one of George III. above the fireplace, and of the Prince of Orange over the doorway. A handsome and massive chandelier is suspended from the ceiling, while the arms of the Corporation—an anchor with the flukes above the stars, and the hand brandishing an oar, which forms the crest,—are conspicuous both on the elaborate marble mantelpiece and in the mural decorations.

" Hard by the Court Room, in a room containing various odds and ends of more or less interest, is a framed certificate of exemption from pressed service in the royal ships of war, for petty officers, harpooners, boat steerers, etc., employed in the whale fishing.

" A passage to the left terminates in the Museum. Here is a valuable and varied collection of curios from many lands, nearly all the gifts of members to the House. Carefully arranged, they form an epitome of the voyages of Elder and Younger Brethren. South Sea canoe paddles covered with carving, curious old sextants, a great model of a man-of-war dating about the end of the seventeenth century, etc. It is a regular sea-museum, redolent of the brine, and breathing memories of the men who have brought it together.

" Here also is the arm-chair commonly used by Captain Cook, and a gun he carried, and a harpoon-gun which was presented to the House as a relic of whaling days.

" Between two stately narwhal tusks, described as horns of the 'Unicorn,' a door opens into the Reading Room. This is elliptical in form, and is lighted by a window looking to the sky.

"The chapel is in keeping with that old-world atmosphere which pervades the whole House. A stained glass window at the east-end represents the Ascension; below it a carved wood eagle supports the Communion Table, a slab of marble resting upon its outstretched wings."

The House possesses a good collection of silver, largely composed of gifts by past members of the Guild. This silver has been described by Mr. T. M. Fallow in the *Reliquary* for 1887-8.

The Trinity House have under their control a number of Almshouses for the benefit of the Brethren of the Guild or their Widows, as well as for other classes of seamen who have fallen into poverty or need. Out pensions are also granted by the House to poor mariners and seamen and their widows and children.

The Trinity House also maintain an important Navigation School, established in 1780, for teaching the Science of Navigation to Boys, most of whom receive clothing and education free. There is also a School for the preparation of adults for the Board of Trade Examinations for Certificates of Competency.

Two important Friendly Societies—The Trinity Provident Society, established in 1802, and the Trinity Provident Sick Club, established in 1869—founded for the encouragement of habits of thrift amongst the seamen of the Port of Hull, are managed at the Trinity House, the Guild being the Trustees and Treasurers of both Societies. These Societies provide, subject to the Rules, Annuities to seamen in old age, and payments during sickness and at death. The Trinity Provident Club Room in Posterngate is also maintained by the Guild, and to this room the

members of both the Provident Societies above mentioned have free admission. An Approved Society under the National Health Insurance Act has also been established.

WILBERFORCE MUSEUM, HIGH STREET

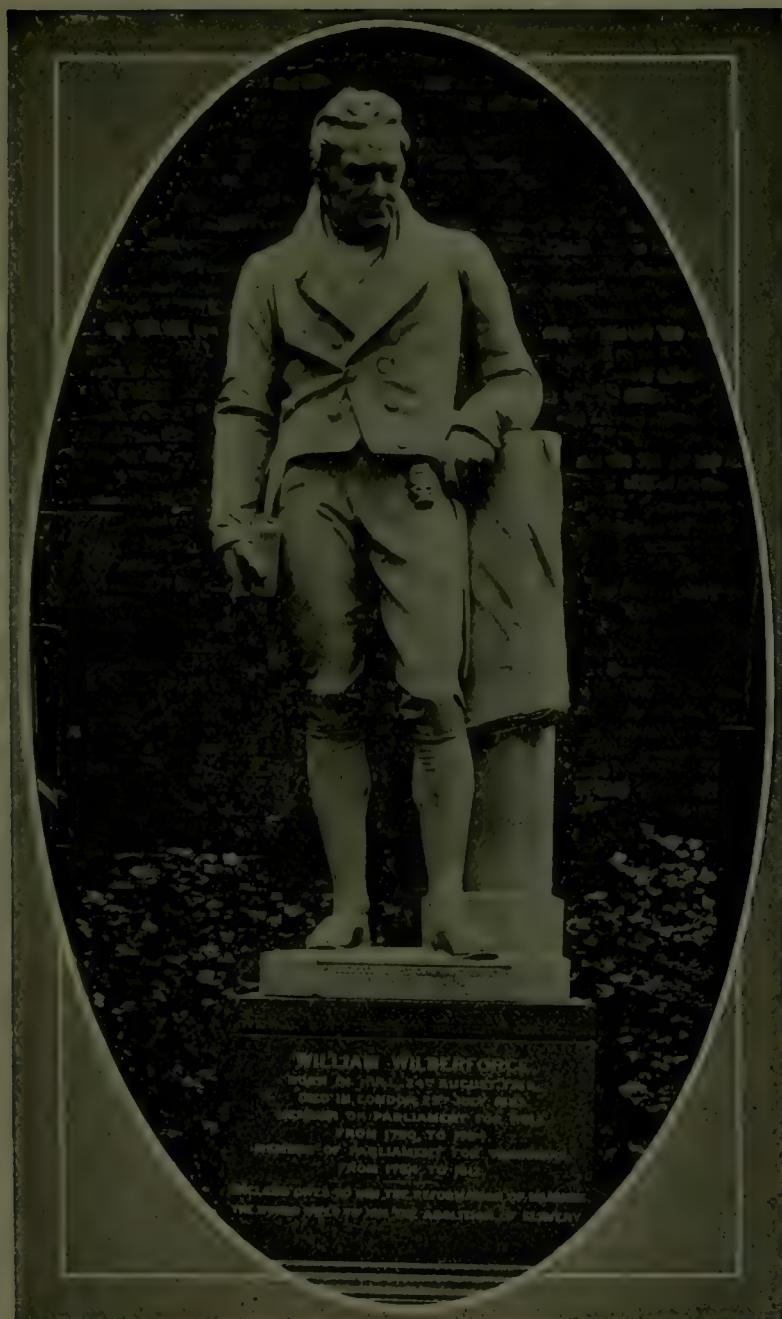
The Wilberforce Museum may probably appear to a visitor to be in uncongenial surroundings. Situated as it is in a narrow thoroughfare, and frowned upon by buildings which are of plain appearance, it might be compared to a jewel in a setting of iron. But it must be remembered that at the time Wilberforce House was built—in the closing years of the reign of Queen Elizabeth—High Street, or, as it was formerly called, Hull Street, presented a very different aspect from what it does to-day. In those old days the entire town was within the walls which were situated along the present line of docks. Where Anlaby Road, Prospect Street, Beverley Road, Spring Bank and George Street are now, were fields. The wealthy merchants of that time lived in High Street, and gradually the side next the river was built upon, the houses here extending from the street and backing towards the river. Some, as in the case of Wilberforce House, had gardens to the river's edge ; others would have their landing-stages, warehouses, etc., at the rear.

Wilberforce House was built for the Lister family, about the end of Elizabeth's reign. It was probably built by the John Lister, merchant, who had acquired the property before 1592. He, the first of the Hull Listers, appears to have come to this town about 1570, and was admitted a freeman in 1577-8. He served as

Alderman, Chamberlain, Sheriff and Mayor, and was also one of the town's representatives in Parliament. It may be taken that this was the John Lister who built the house, and that the over-mantel with the arms of his son was added after the knight became possessor of the residence.

This over-mantel was removed to the residence of one of the Wilberforce family living near Harrogate many years ago. Largely through the generosity of Sir W. H. Cockerline, it has now been restored to its original position, and is one of the treasures of the building.

The original structure has been very much altered at different times to meet the various purposes it had to serve. The greatest changes appear to have been made about the middle of the eighteenth century, when the property came into the possession of the Wilberforces. At that time the rooms at the rear of the building, as well as the magnificent staircase and charming ceiling, were added, and the large room on the ground floor, which is panelled in deal, as well as the room in which William Wilberforce was born, were also altered at the same period, as was the marble-paved hall. The front part of the building, however, as seen from the street, and most of the rooms there, are more or less in their original condition. Unfortunately, in the early part of the eighteenth century, the windows facing the street have been enlarged. In place of the original small casements with leaded lights, sash windows have been inserted, to accomplish which part of the brick-work has been cut away below each casement. The result is, as can be seen from a cursory glance at the windows outside, that the rectangular brickwork designs have been mutilated.



STATUE OF WILLIAM WILBERFORCE.
Now in the garden at Wilberforce House.

The brickwork in this building is very fine indeed, and though the bricks are several hundred years old, they will long outlive the few twentieth century bricks which have recently been included where repairs were necessary.

In more modern times many changes have taken place, while the building has served as a counting house, warehouse, and corn merchants' offices. A staircase once existed at the entrance to what is now the whaling room, connecting the upper part of the building with the first floor. In this upper portion, which can at present only be reached by means of a ladder, the servants formerly slept, and the kitchens apparently were situated.

On the roof at the back of the building are the original flat red tiles which would formerly cover the front portion, but which were evidently removed to the back during the eighteenth century alterations, when the present pan-tiles were placed on the front roof of the building. It would add much to the charm of the structure were it possible to replace the flat tiles in the front portion. Many other minor alterations might be mentioned, but we must be content with saying that the Museums Committee, since taking over the building, has done its utmost to restore it to the condition in which it was in the time of the man whose name the house bears. In this they have been generously assisted by members of the Reckitt family, and Messrs. James and Charles Downs.

All Citizens of Hull are proud of this building from the fact that it was the birthplace, on the 24th of August, 1750, of William Wilberforce, who did so much for the abolition of negro slavery. The actual room in which he was born is much in the same condition as

in his day, and in it we have exhibited something like sixty portraits and engravings, representing him at various periods of his life, from quite a boy, to just before his death, which event took place in 1833. The country appreciated Wilberforce as a man, and his mortal remains were placed in Westminster Abbey.



WILBERFORCE HOUSE IN HIGH STREET.

His townsmen showed their appreciation by the erection of the memorial column at Whitefriargate Bridge, a monument of the massive character which seemed to characterise the structures made by the people of that period.

Quite apart from the associations of Wilberforce with this building, and quite apart from its attractions as an early example of domestic architecture, Wilberforce House is one which should be respected and

revered by every citizen of Hull. It has played a most important part in many ways in the history of this city. In 1639, Charles I. was entertained there, and there is no doubt that Andrew Marvell was very familiar with the building; in fact, could these walls but speak, they would doubtless acquaint us with many most important chapters in the history of this city.

Some years ago an opportunity occurred of purchasing an undivided half of Wilberforce House, and at that time the late Alderman John Brown issued an appeal urging that this interesting building should be purchased for the town, and that it should be made into a local museum, illustrative of the history of the town or associated with its bygone worthies, and contain memorials of Wilberforce himself.

A "local museum" Wilberforce House now is, and while all of it is not yet available for public inspection, it must be admitted that since the building was opened in 1906, it has been appreciated by the public. We have been fortunate in securing many relics of Wilberforce, including his diary, covering many years, handbills, election cards, addresses, engravings, etc. Mention should be made of a fine old Worcester tea service, a magnificent Chippendale chair, and other relics, but more especial attention should be drawn to the library of about 300 books, most of which contain his signature or his book-plate. These were originally used in this very building by Wilberforce, and it is pleasant to find that, after many vicissitudes, they have been returned to their original home.

"YE OLDE WHITE HARTE," SILVER STREET

This tavern is of antiquarian interest as having been the residence of the Military Governors of Hull,

one of whom, Sir John Hotham, closed the gates of the town in the face of King Charles I. It is reached by a narrow covered passage from Silver Street or Bowlalley Lane. The house is well-preserved, the front having still its ancient aspect, but minus the courtyard and gardens, which, no doubt, were attached to it. The old arched fire-places are a feature. On the first floor, approached by a massive oak staircase, charred by flames, are two oak-panelled rooms, one, known as the "plotting parlour," is where the Council of War sat which determined upon the desperate course of defying King Charles I. and his following. There was a secret passage to this room.

WILBERFORCE MONUMENT

The first stone of the column was laid on the 1st of August, 1834—the era of the abolition of slavery in British Colonies. No date could have been more happily chosen, and the statue of the Emancipator, which is twelve feet in height, was fixed in position on the 12th of November, 1835. The total height of the monument is 102 feet.

PUBLIC LIBRARY

The Public Libraries' Acts were adopted on the 10th December, 1892. In 1889 Sir James Reckitt, Bart., established a Free Library on the Holderness Road, in the eastern portion of the City, which was reserved for the inhabitants of the district, subscribing a sum annually for its maintenance—equal to what would have been realised had the Library rate of 1d. in the pound been laid in the district. On the adoption of the Public Libraries' Acts he handed the buildings,

books, furniture, etc., together with a sum of £9,322 in stocks and shares for its maintenance, over to the Public Libraries' Committee.

The Central Public Library in Albion Street was erected in 1900-01, at a cost, including site and fittings, of £20,000, and was opened on the 6th November, 1901, by Lord Avebury.

The library contains 40,000 volumes, not including the Patent Library, comprising the Specifications, Abridgements and Indexes and other publications issued by the Patent Office, which can be consulted in the reference library.

The Reference Library is particularly well equipped with books relating to the natural history of the county, the Corporation having purchased the library of the Yorkshire Naturalists' Union a few years ago. The library of the Hull Geological Society is also deposited here.

In addition to the James Reckitt Library, branches are established on the Boulevard, Beverley Road, the West Park, and Hedon Road.

THE MUNICIPAL ART GALLERY

The Municipal Art Gallery comprises two large and two smaller rooms, excellently designed and lighted. In addition there is a central gallery.

The city possesses a permanent collection of works of modern artists. Among the generous donors of a large number of charming pictures the name of the Rt. Hon. T. R. Ferens, M.P., the High Steward of Kingston-upon-Hull, is prominent. At the inauguration of the Collection, Mr. Ferens contributed £1000 a year for ten years. The same gentleman has since given £60,000 for the purpose of erecting a new Gallery

in the City Square, having previously purchased the site.

THE CITY HALL

On the west side of the square is the City Hall, erected from the designs of Mr. J. H. Hirst, the City Architect. The building, which has cost upwards of £100,000, fronts the square and occupies the whole of the block comprised between Waterworks Street,



THE CITY HALL.

Carr Lane and Chariot Street. There are side entrances in Waterworks Street and Carr Lane. The large Public Hall is approached by a handsome staircase of coloured marbles.

The ceiling of the entrance hall is supported on a series of graceful columns which flank the staircase.

Opening from the grand staircase is a spacious crush room, panelled in oak, ante to the main hall, and over the entrance hall are other rooms used as card and smoking rooms, buffet, etc., at civic and other social functions.

HULL COINS AND TOKENS

By W. SYKES

ONE of the most interesting cases in the Wilberforce House Museum is that containing the collection of local coins, tokens, and medals, embracing nearly seventy specimens of the "regal and token coinage" relating to Hull. A mint was established in this city by Edward I., in the year 1300, and two silver pennies which were struck in this mint are in the museum. About the year 1300 there seems to have been a coinage of considerable extent, for according to the Red Book of the Exchequer it was ordained upon the 29th of March "that there should be in London thirty furnaces, in Canterbury eight, in Kingston-upon-Hull four, in Newcastle-upon-Tyne two, in Bristol four, and in Exeter two." The mints at Bristol, Newcastle, Kingston-upon-Hull, and Exeter were now either worked for the first time, or were considerably enlarged, as a writ was issued in this year which ordered houses to be built for the workmen. This selection of Hull to be one of the places wherein to erect a mint appears to be a very notable instance of the favour that King Edward I. showed towards this town.

Only one variety of coin, so far as is known, was struck in the Royal Mint at Hull, and that was the piece of silver of the value of a penny. On the obverse the King is represented, full faced, and crowned with an open crown fleurie, consisting of three fleurs de lis, with two rays or lesser flowers, not rising so high as the others, placed between them. On the reverse is a cross

potent extending to the outer edge of the coin, with three pellets in each quarter.

The inscription reads :—

Obverse.—EDW. R. ANGL. DNS. HYB. Edwardus.
Rex Angliæ Dominus Hyberniæ. Edward, King
of England, Lord of Ireland.



Reverse.—VILL KYNGESTON (Villa Kingston,
Town of Kingston-upon-Hull).

Edward II., who succeeded his father in 1307, probably continued to mint coins in Hull, but the modern writers on English coins do not chronicle any such coin as belonging to Edward II. with the Hull mint mark upon it. One writer states that Edward III. also used the Hull mint, as the type of the “penny of this King is the same as those of his father and grandfather,” but there is no authority on record to prove this.

SEVENTEENTH CENTURY TOKENS

Of the seventeenth century tradesmen's tokens there are 30 examples out of 34 known. They are in excellent preservation, and an examination of them affords interesting information respecting some of the leading merchants and tradesmen of the olden days. It may, however, be advisable to explain how these tokens came to be in use. From the departure of the Romans until the reign of Elizabeth there had been no legalised copper or brass coinage in the realm with the exception of the Northumbrian stycas of the eighth

century. The only circulating medium during that time for the purchase of cheaper necessaries of life was silver, or what was made to pass for such, and as years rolled on, and the population and trade increased, the want of small change was most severely felt. Leaden trade tokens were issued contrary to the law, in Henry VII.'s reign as an attempt to supply this demand, and in spite of enactments against them they remained in circulation until the reign of James I. when they were abolished. Both James I. and Charles I., however, granted patents to private individuals for the issue of copper farthings, but their legal issue ceased in 1644. In 1648 local tokens began to be issued, first in London, and then all over the country, and continued until 1672. They were issued by more than 14,000 persons engaged in all departments of trade, from the large manufacturer and innkeeper down to the humblest tradesman. They comprised pence, halfpence and farthings, and were chiefly circulated in the locality where the issuer lived. They would pass as money in any neighbouring place where the issuers were known. Current coin or value for the tokens was always given by the tradesmen on their return.

William Boyne, of Leeds, in 1858, published a work on the Seventeenth Century Tokens, and in 1889 Dr. G. C. Williamson extended the work of Boyne by the publication of a two volume work, adding observations on the issuers, and describing many tokens found since the original work was issued. The late Councillor Charles E. Fewster, the Sub-Editor for the Yorkshire section, also contributed an article on "The Hull Coinage" in Wildridge's "Old and New Hull." An unpublished MS. by the late John

Richardson, Dentist, of Hull, gives many interesting accounts of the various issuers, and this, together with the blocks from which the illustrations are taken, were purchased at the sale of the late C. E. Fewster's Books, etc., many years ago.

The following is a list of the tokens of Hull. Those marked with an asterisk are required to complete the Hull Museum collection. The first illustration in each case is the obverse, and the second the reverse.



MARGRET ABBOTT, HALFPENNY.

Margret Abbott kept a public house un the Market Street, of the sign of the Three Crowns, and is buried in St. Mary's Church, Lowgate.

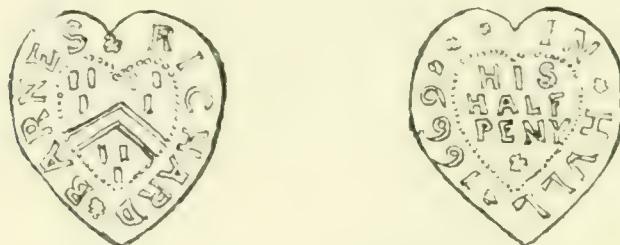


JOHN BAKER, HALFPENNY, 1665.



JOHN BAKER, FARTHING, 1665.

John Baker issued a halfpenny and a farthing token. This man was a pewterer by trade, and was known as the Protestant Tinker. John Baker was Chamberlain of Hull in 1669.



RICHARD BARNES, HALFPENNY, 1669.



RICHARD BARNES, FARTHING, 1672.



SAMUEL BIRKBY, FARTHING, 1666.

Samuel Birkby issued a farthing, on the obverse of which is the name, and in the centre a "wheat sheaf," denoting the trade in which he was engaged.



WILLIAM BIRKBY, HALFPENNY, 1668.

William Birkby issued a halfpenny. The initials on the obverse (W. K. B.) are probably those of his wife.



JOHN BLANCHERD, HALFPENNY.



JOHN BLANCHERD, FARTHING.

John Blancherd issued both a farthing and half-penny. John Blancherd was Chamberlain of Hull in 1665, and Sheriff in 1687.



WALTER BROKETT, HALFPENNY, 1666.

The Broketts were an ancient family in Yorkshire, and this token gives the arms of the Brokett family.



LYONELL BUCKLE, HALFPENNY, 1665.



LYONELL BUCKLE, FARTHING, 1665.

Lyonell Buckle issued both halfpennies and farthings. He plays upon his name by putting a buckle on his tokens. Lyonell Buckle was Chamberlain of Hull in 1640, and Sheriff in 1681.



*WILLIAM FEILD, HALFPENNY, 1666.



ROBERT FELLOWES, HALFPENNY, 1698.

Robert Fellowes. The device on this halfpenny token is a stocking.



JOHN GOODWIN, HALFPENNY, 1666.



JOHN GOODWIN, FARTHING.

John Goodwin issued both a halfpenny and farthing. The device is a "rose and crown."



HENRY HILLARD, FARTHING, 1669.



EDWARD HODGSON, HALFPENNY.

Edward Hodgson issued a halfpenny. There are three hats on the obverse of this token. Edward Hodgson was Chamberlain of Hull in 1667.



GEORGE HODGSON, HALFPENNY, 1668.

George Hodgson. A man smoking a pipe is shown on the obverse of this halfpenny token.



*PHINEAS HODSON, FARTHING, 1666.



THOMAS LAMBERT, FARTHING, 1664.



*RICHARD PERRY, FARTHING.



WILLIAM ROBERTSON, FARTHING.

There is also a variety of this farthing with larger loops on the reverse.



WILLIAM ROBINSON, HALFPENNY.

William Robinson was Chamberlain of Hull, 1668, and Sheriff in 1682. He endowed a hospital known as Robinson's Almshouse for Poor Seamen, their wives and widows. In 1697 Robinson conveyed the property to the Trinity House.



***THE GOULDEN LION AT THE SOUTHENEND IN HULL.**



JOSHUA SCOTTE, FARTHING.

Joshua Scotte or Scot was Chamberlain of Hull in 1690. The merchant's mark shown on the reverse of this token indicates that Scotte was a member of the Merchants' Adventurers Company.



RICHARD STOCKDAILE, HALFPENNY, 1665.



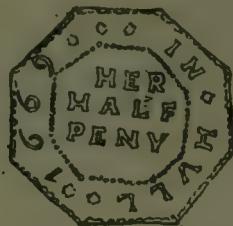
RICHARD STOCKDAILE, FARTHING.

Richard Stockdale issued both a halfpenny and farthing.



RICHARD SUGDEN, FARTHING, 1664.

Richard Sugden was a mercer in Hull, and the token gives the merchant's mark and initials, "R.S."



ELIZABETH THOMPSON, HALFPENNY, 1669.

Elizabeth Thompson. A ship on the obverse of this halfpenny token probably indicates that she was an innkeeper. This token is of an unusual shape, viz., octagonal.



THOMAS WATSON, HALFPENNY, 1668.

Thomas Watson. The Tallow Chandlers' Arms is shown on the obverse of this token.



MARY WITHAM, HALFPENNY, 1669.

Mary Witham. This token is very rare, and peculiar as being heart-shaped, and also from all the letters being in italics.



JONAS YOULE, FARTHING, 1666.

Jonas Youle kept the Cross Keys Hotel in the Market-place, Hull, and issued a farthing token. The old sign (Cross Keys) is shown on the obverse.

EIGHTEENTH CENTURY TOKENS

Towards the end of the eighteenth century the scarcity of ordinary current pieces caused the re-appearance of tradesmen's tokens in countless varieties. The regal copper coinage became very scarce, owing to the Government of George III. ceasing for a long period to mint in that metal, and private persons came forward to supply the needs of the country, and these were in circulation from about 1787 until 1797. In many cases the tokens have an inscription on the edge in indented letters. In 1796 Samuel Birchall, of Leeds, issued the first descriptive list of these tokens, and in 1802 James Atkins also published a very exhaustive work on the subject. The only token issued in Hull is the well-known Garton halfpenny, as follows :—

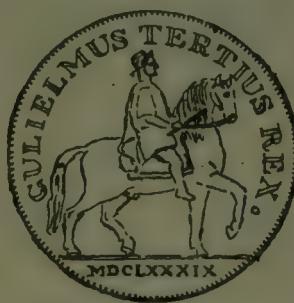
Obverse.—Hull halfpenny, 1791. The arms of the Corporation of Hull in shield between oak branches.

Reverse.—Gulielmus Tertius Rex. MDCLXXXIX. The equestrian statue of William III. in the Market Place, Hull.

Edge.—Payable at the warehouse of Jonathan Garton and Co.

Examples in mint state are shown in the case, two of which are bronzed and rarely met with.

The issuer of this token, Jonathan Garton, kept a draper's shop in the Market Place, Hull. He was one of the trustees of the Holy Trinity Church burial



ground in Castle Street, mentioned in the Act of Parliament in 1783. Messrs. Rudston and Preston succeeded him in the business, and issued the Hull silver tokens, which are mentioned in the nineteenth century list.

The obverse of this token is occasionally mixed with tokens of other towns, which are called mules, *i.e.*, pieces with the obverse of one pattern and the reverse of another. The following varieties are in the museum case :—



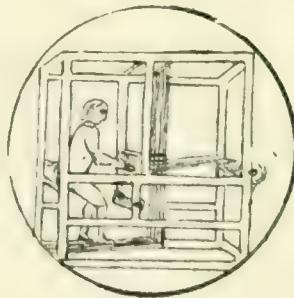
Edge reading.—Payable in Hull and in London.



Edge reading.—Current everywhere.



Edge.—Payable in London, Bristol, and Lancaster.



Edge.—Payable in Hull and in London.



Edge.—Payable in Hull and in London.



Edge.—Payable in Hull and in London.



Edge.—Payable in Hull and in London.



Edge.—Payable in Hull and in London.



Edge.—Payable in Hull and in London.

NINETEENTH CENTURY TOKENS

The nineteenth century tokens appeared in 1811, and were in use until 1817. These are quite different in style, and consisted chiefly of pennies. It was not, however, until the year 1864, that any standard publication appeared, when Mr. W. J. Davis, of Birmingham, published "The Nineteenth Century Token Coinage."

The Hull Leadworks tokens, better known as Picard's Penny and Halfpenny tokens, are the only nineteenth century tokens issued by Hull tradesmen in copper. The dies were made in Birmingham, and one million

of the pennies, half-a-million of the halfpennies, and of the Wellington halfpennies one million were issued. Their value amounted to £7292, and their weight in copper to above forty tons.*

These tokens were in constant use in Hull in 1812 and 1813, and every Friday morning they were returned to the lead works to be exchanged for current money of the realm. They were again re-issued in payment of wages, etc., and were a great convenience to the public owing to the scarcity of copper coinage at that period.

John Kirby Picard passed four years with Mr. Smith, an Attorney in Hull, and went to London in 1785 to Messrs. Kilvington & Lowndes, Lincoln's Inn, where he finished his term. He returned to Hull and commenced practice as an Attorney, his office being in Trinity House Lane.† Local historians hitherto have dealt very little with the Picard family, and a few extracts from MSS. in my possession are given.

"John Picard, the father of J. K. Picard, was the first to introduce the manufacture of white lead into England, in 1791, erecting his factory on the south side of the Old or Queen's Dock, in Hull. The manufacture of white lead had hitherto been carried on chiefly in Holland. Dr. Brown, of Sheffield, observing that pig lead was sent from Derbyshire to Hull, to be shipped to Holland to be made into white lead and then imported into England, turned his attention to its manufacture, and having a knowledge of chemistry, soon made the discovery that the fumes of vinegar and carbonic acid acting upon the sheets of lead would

* A full description of Pickard's Tokens is given in "The Nineteenth Century Token Coinage," by W. J. Davis, 1904, numbered 81 to 116.

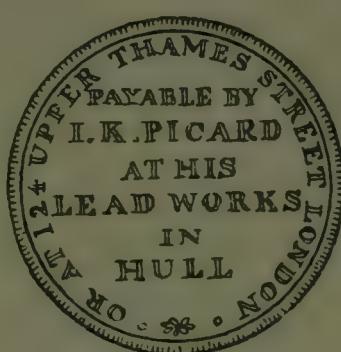
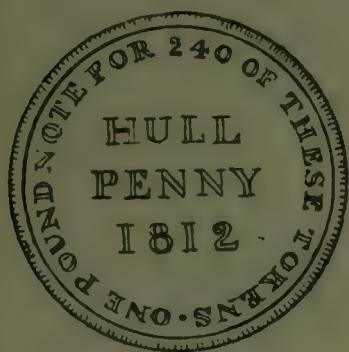
† According to Battle's "Hull Directory" of 1791

produce white lead. John Picard, the father, being acquainted with Dr. Brown, was induced to enter into experiments to perfect the material, and eventually the lead works were established in Hull, being the parent establishment of all the lead works in England."



The lead works were built upon a portion of the land which, in the earlier history of the town, formed part of Suffolk Palace, and was on the south side of the Queen's Dock, with a back entrance into Whitefriargate. During the excavations for the new Police Station, several of the jars used in the manufacture of white lead were found, and some specimens are shewn in the Wilberforce Museum.

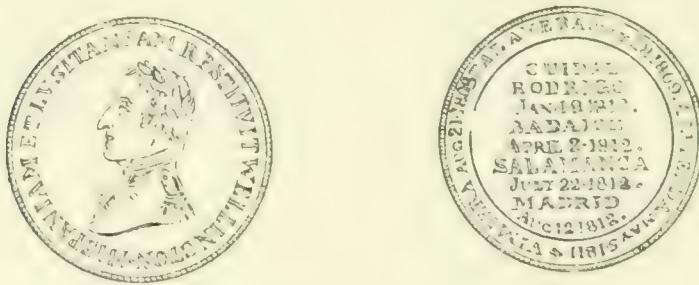
John Picard, the father, born at Hollym, December 1721, was the son of Sam Picard, who was buried at Hollym in 1730. J. Picard died on the 16th October, 1801, aged 79, and was buried in a vault on the west side of the walk leading to the south door of the transept of Holy Trinity Church. The son, John Kirby Picard, undoubtedly succeeded his father in the lead



manufactory business, although, as before stated, he was practising as an attorney in Hull, and eventually became a barrister and was appointed Deputy-Recorder of Hull. At the date when the tokens were issued he appears to have been a man of note and wealth; so much so that in 1811 he was solicited to stand as a candidate for the office of Member of Parliament for Hull, which he declined in a letter dated for the 4th March, 1811, from Summergangs House, Holderness

Road. On the site of this house was formerly "Portes House," which Picard pulled down and built another mansion—Summergangs House or Picards Hall, placing over the front entrance a large shield with his crest and motto, as seen on the halfpenny.

"Picard's business often called him to London, and he made an extensive acquaintance with the nobility and leading men in Parliament and the fashionable world. At the time the French armies in Spain and Portugal, under the command of Napoleon Bonaparte's generals, were being beaten in a succession of battles



by Arthur, Duke of Wellington, Picard decided to issue a token with the names of the battles, and their dates on one side, and a profile of Wellington on the other, and as fresh victories were gained Picard issued new tokens with the additional battles, until at length, instead of having one list of victories in a circle round and in the centre of the token he was obliged to add another circle with victories and dates.

"Picard at this time frequented the London clubs, and entered into dissipations of the period, and at one of these meetings some of these tokens were exhibited by him, and as Wellington was then the idol of the British people and the intimate friend of the Prince Regent (afterwards George IV.), the circum-

stance was mentioned to the Prince, who invited Picard to Court to exhibit his tokens. Before, however, he had an audience, he ordered several to be struck in silver, containing all the victories to that date.

"From this visit to Court may be dated his ruin. Drawn into the whirl of gaming and dissipation which then prevailed, he lost large sums of money, the result being that he had to sell Summergangs Hall and other property to pay his debts."

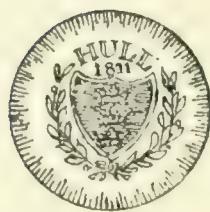
He struggled on for years after this, but eventually retired altogether from business, which passed to other hands. He was getting old, and he passed his later days in compiling his memoirs, and procuring subscribers for his work, but these do not appear to have ever been published.

After leaving Summergangs Hall, he probably resided in Dansom Lane or Pemberton Street, but his means being so reduced, he was appointed to a vacant room in the Charter House, and died within three days after his appointment, and before he had taken possession of his room.

The lead works have entirely disappeared, and warehouses, etc., now take their place. Summergangs Hall eventually became the property of the Jallands in 1838, and the old Hall was pulled down and the present house, in the Elizabethan style, was built and named Holderness House. It is now occupied by T. R. Ferens, Esq., P.C. I believe the lead works carried on at the present time by Messrs. Tudor & Son, in Church Street, can claim some connecting link with Picards of the past.

J. K. Picard died on the 5th July, 1843, aged 77 years, and was buried in the vault at Holy Trinity containing the body of his father.

Rudston and Preston were linen drapers, silk mercers, and hatters, and carried on business in the Market Place, in the shop previously occupied by



Jonathan Garton. The tokens issued by them were of silver, of the current value of one shilling and sixpence, and sixpence.

For the loan of the many blocks accompanying this article, I am indebted to Messrs. A. BROWN & SONS, publishers of the Handbook.

HULL CHARTERS

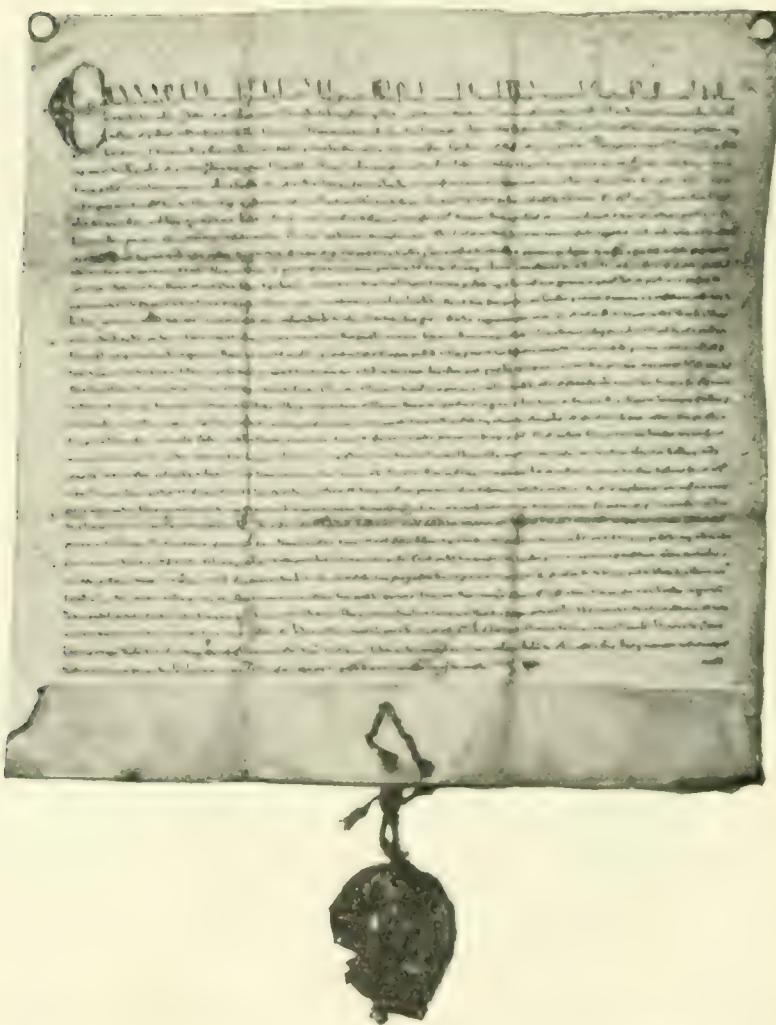
OUR first Royal Charter is dated April 1st, 1299, and by it the Borough became the King's town, was called Kingston-upon-Hull, a name it still retains, though Hull is the name by which it is now generally known.

King Edward's Charter is preserved in the Corporation archives. It is in Latin, but the following is a translation of that part giving trading facilities to the burgesses :—

" We do will and grant moreover, for us and our heirs, that the said Burgesses and their heirs throughout all our realm and dominion, shall be for ever free from toll, pontage, passage, pavage, and murage and from all other customs to be taken of their own goods and merchandise : and that all those of the aforesaid borough, desiring to enjoy the aforesaid liberties and free customs, shall be at geld and scot,* with the same Burgesses, whenever it shall happen, to that borough to be taxed. We do grant, moreover, for us and our heirs, to the aforesaid burgesses, that they and their heirs shall for ever have two markets in every week within the aforesaid borough, to be held in a place appointed thereto by us, namely one on Tuesday and the other on Friday, and one fair there in every year, to continue for thirty

* Both these words "geld" and "scot," which are equivalent to "scot and lot" in later charters, mean *tax*.

days, namely, on the day of St. Augustine after Easter, and for twenty-nine days next following, unless those markets and that fair shall be



THE ROYAL CHARTER GRANTED TO HULL BY EDWARD I. IN 1290.
In the Guildhall.

to the injury of neighbouring markets and fairs."

Later, on June 21st, 1532, King Henry VIII made

further grants to the inhabitants of Hull, by means of which “foreigners” were prevented from trading in the town, except during the fairs. In his Charter we read :—

“ We have granted, and do give licence, for us our heirs and successors, to the Mayor, Burgesses and Commonalty of our town or borough of Kyngston-upon-Hull aforesaid and their successors for ever, that no stranger or foreigner to the liberty of the borough aforesaid, hereafter shall buy, from any stranger or foreigner to the liberty of the borough aforesaid, or shall sell to any such stranger or foreigner to the liberty of that borough, within that borough, any merchandise or any other things whatsoever, except only in the time of the mart or of the fairs hereafter to be held within the borough aforesaid, bought or sold, or to be bought or sold contrary to the form aforesaid, to be converted to the use of the Mayor and Burgesses of the borough aforesaid and their successors: And that they and their successors, from time to time, by their servants and any one of them, may put themselves in seisin thereof, without rendering, paying or making account or any other thing, to us, our heirs or successors.”

On August 21st, 1598, Queen Elizabeth granted two “market days” each week—on Tuesdays and Fridays :—

“ Know ye that we, of our superior special grace, and of our certain knowledge and mere motion, have given and granted, and, for us, our heirs and successors, by these presents, do

give and grant, to the aforesaid Mayor and Burgesses and their successors, henceforth for ever, shall and may have and hold, within the same town or borough, to be appointed by the



PORTION OF A CHARTER GRANTED TO HULL BY HENRY VI, IN 1413.
In the Guildhall.

Mayor and the greater part of the Aldermen of the town or borough aforesaid for the time being namely one market to be held and kept in every week on Tuesday, and the other market on Friday in every week."

The same Charter gives the Mayor and Burgesses permission to hold an annual mart or fair for fifteen days in September, "yearly and every year."

A Charter dated December 3rd, 1661, issued by Charles II., confirms the grant of the market days and fairs, and later monarchs do the same.

The market days, Tuesdays and Fridays, still hold, and on these occasions temporary stalls are erected in the market hall, in the area surrounding Holy Trinity Church; and the market place and other meeting centres are thronged with farmers and others from the surrounding towns and villages. Similarly "Hull Fair," held ever since in October, has been an important institution for hundreds of years, and is one of the most important Fairs held in the British Isles. On such occasions the whole City seems to be transformed into a vast bazaar, and every possible commodity is offered to the tens of thousands of visitors from all parts of Yorkshire and Lincolnshire. Besides the hardware, wood goods, clothes and everything else likely to be required by the visitors, there is an important horse fair; hundreds of temporary stalls and bazaars are erected for the sale of toys and sweets for the children, or for more or less useful if not always ornamental household objects to tempt their mothers. In addition, certain parts of the City are transformed into a very Bedlam with roundabouts, swings, shooting galleries, travelling menageries, circuses, sea serpents, double-headed oxen, jugglers, in fact anything likely to cause circulation of the coin in the well-filled pockets of the country visitors. The fair tolls are a good source of income to the Corporation, and Hull's shopkeepers always reaped a rich harvest during "Hull Fair Week."

The following is a list of the Charters, etc., in the possession of the Corporation :—

	DATE
Charter of Edward I. ...	1200
Letters Patent of Edward I. ...	1302
Charter of Edward II. ...	1312
Letters Patent of Edward II. ...	1315
Letters Patent of Edward II. ...	1321
Letters Patent of Edward III. ...	1320-7
Charter of Edward III....	1330
Charter of Edward III....	1331
Charter of Edward III....	1334
Letters Patent of Richard II. ...	1377
Charter of Richard II. ...	1382
Letters Patent of Henry IV. ...	1399
Letters Patent of Henry V. ...	1414
Letters Patent of Henry VI. ...	1431
Letters Patent of Henry VI. ...	1433
Charter of Henry VI. ...	1440
Letters Patent of Henry VI. ...	1440
Letters Patent of Henry VI. ...	1443
Charter of Henry VI. ...	1449-7
Letters Patent of Edward IV. ...	1492
Letters Patent of Henry VIII. ...	1510
Letters Patent of Henry VIII. ...	1532
Letters Patent of Edward VI. ...	1547
Letters Patent of Edward VI. ...	1552
Letters Patent of Mary (1) ...	1553
Letters Patent of Mary (2) ...	1553
Letters Patent of Elizabeth (1) ...	1570-7
Letters Patent of Elizabeth (2) ...	1577
Letters Patent of Elizabeth ...	1582
Letters Patent of Elizabeth ...	1598
Letters Patent of James I. (1) ...	1610
Letters Patent of James I. (2) ...	1610-II
Letters Patent of Charles II. ...	1661
Letters Patent of James II. ...	1685
Letters Patent of James II. ...	1688
Letters Patent of Victoria ...	1807

THE CHARITIES OF KINGSTON UPON HULL

By JOHN WATSON, F.S.I.

THERE are scattered through the length and breadth of England many memorials of the piety and charity of our forefathers, who, living in times when there were neither Poor Laws nor Workhouses, and benevolence was altogether spontaneous, were mindful of their necessitous brethren, and few towns or cities in this country can boast of more or older charitable institutions than can Hull, consisting, as they do, of the following, viz.:—The Hull Charterhouse, Sir John Lister's Hospitals, the Minor Hospitals, comprising Crowle's, Weaver's, Gee's, Harrison's, Fox's, Ellis's, Gregg's and Bishop Watson's Hospitals, Ferries' Charity for Apprenticing, Ferries' and Bury's Exhibition, Cogan's School for Girls, Cogan's Marriage Portion, Cogan's Charity for Boys, Ann Watson's Charity, Toft's Charity, Chamberlain's Charity; also the many Hospitals connected with the Hull Trinity House, the splendid Orphanages, the Ferens', Reckitt's and Pickering Almshouses, and the Lee Rest Houses.

Within the limits of a paper of this nature, it is only possible briefly to glance at the history of the Charities, dating back, as they do, from about the year 1600. Prior to the year 1836 the Charities in the country

were principally governed by the Municipalities, and the property which had been given for the purpose of particular charities had become so mixed up with land belonging to the Corporations, tending, in many instances, to the disadvantage of the Charities, that it was wisely decided by Parliament to entirely separate the Charity Estate from that belonging to the Municipality. Charity Trusts were formed in the year 1836, and it was in consequence of the Reform Act about that date that the Municipal Corporations, as we know them, were brought into existence.

In Hull, as in most other places, the property bequeathed for Charity got mixed up with that belonging to the Corporation, and after a very full enquiry in the year 1879, when the management of the Minor Hospitals was transferred to the Charity Trustees, it was agreed that the Corporation should pay annually the sum of £1000 towards the maintenance of these Hospitals, in lieu of land appropriated in times past by the old Corporation.

Ferries' Charity was founded by Thomas Ferries, Alderman, of Hull, and dates back to the year 1630. Its object is to assist fatherless children in being put apprentice to some suitable trade, and the benefits have been increased from time to time in consequence of accumulated income. The grants now amount to 20 guineas to a boy serving seven years, with a sliding scale for lesser amounts for shorter periods, and in recent years attendance has been made compulsory at the Technical Schools, for which additional grants are given. In consequence of a large increase in the accumulated funds of the Charity, an attempt was made in the year 1875 to divert a sum of £10,000 for the purpose of endowing the Grammar School, but in

consequence of strong opposition, the proposal was withdrawn.

Ferries' and Bury's Exhibition. This dates back to the year 1627, property being left, the rents from which were to be bestowed for a Scholarship upon "some poor scholar, apt to learn, born within the town of Kingston-upon-Hull or the town of Beverley, whose friends should not be able to maintain him at school, and that when any such poor child should be



COPY OF INSCRIPTION ON STONE OVER DOORWAY
OF OLD COGAN SCHOOL.

fit for Cambridge, then that the said Mayor and Burgesses should bestow the rent for the better exhibition and maintenance in learning in some of the Halls in the University of Cambridge, and that the gift should remain and stand good from one poor scholar to another for ever without fraud or guile."

Cogan's School for Girls was founded by William Cogan, Alderman, of Hull, and dates back to the year 1753, and its object is to clothe and educate children of poor parents, and by his Will the testator

states that "They should be taught to knit, sew, wash and get up linen, to wash rooms, and other house work, to fit them for useful servants," and also that they be taught the Church Catechism, and a private morning and evening prayer. He also devised that each girl on leaving the School should be given a Bible. The School is now situate in Park Street. Originally the School was in Salthouse Lane, and over the doorway there was a curious inscription, the translation of which, as given in an old minute book in the possession of the Trustees, is as follows, viz., Popish rendering :—"Oh may this be an acceptable sacrifice to God, oh let it cancel the multitude of my sins. Amen." Protestant rendering :—"Oh may this be an acceptable sacrifice to God, oh let it continue till many orphans may say Amen." Originally the girls used to wear a very quaint dress, a model of which may now be seen in the Wilberforce Museum. Alderman Cogan lived to the age of 96, was Alderman of the City for 57 years, and Mayor in the years 1717 and 1736. By a further indenture in 1760, further money was left for what is termed "Cogan's Marriage Portion," to encourage girls to enter and remain in domestic service, the qualification being seven years' service, and not less than one year in each situation.

Lister's Hospital was founded by Sir John Lister, and dates back to the year 1640. The Hospital was originally situate on the South Church side, and was for six poor men and six poor women. By means of judicious investment in land, which, owing to the development of the town, has increased in value, the income proved sufficient to increase the number of inmates to 32. Originally the inmates were paid 8d. per week, but from the cause previously mentioned



MODEL SHOWING FORMER COSTUME OF COGAN SCHOOL GIRL.

this has been increased at various dates, and at the present time is 10/- per week, with two rooms, coal, light, etc., in addition.

The Minor Hospitals, *i.e.*, Weaver's, Gregg's, Gee's, Harrison's, Fox's, Crowle's, Ellis's and Bishop Watson's, were originally situate in different parts of the old town, and in consequence of becoming dilapidated and unsatisfactory, they were all amalgamated in 1881, under a scheme by which a New Hospital was built in conjunction with Lister's Hospital in Northumberland Avenue. Originally, the stipend paid to the inmates was 2d. and 4d. per week, but the amount now paid is 10/- per week, with room, coal, light, etc., in addition, the total number of inmates being 76.

The Hull Charterhouse was founded in the year 1384 by Sir Michael de la Pole, in furtherance of the dying wish of his father, Sir William de la Pole, the first Mayor of Kingston-upon-Hull. None of the many Hospitals found within the compass of the vanished walls of the City has a more revered antiquity or so interesting a history, or testifies so loudly to the wisdom and generosity of its founder, as does the Hull Charterhouse, properly and legally styled "God's House Hospital," and it doubtless owes its present popular designation to the fact of its close proximity to the Carthusian Monastery. Originally the Hospital was for 13 poor men and 13 poor women, who were to receive 40/- per year for living and clothing, *i.e.*, 8d. each per week, and the residue of the 40/-, which would be 5/4, at the four usual feasts in the year. The Charterhouse has been extended from time to time. In recent years, the late W. T. Dibb added fourteen rooms, and his son Oscar Knocker Dibb left

the sum of £1000 a few years ago. The number of inmates now exceeds 100, and the stipend has been increased to 10/- per week, with room, coal, light, etc., in addition.

Space does not permit dealing with the valuable Charities connected with the Trinity House or the several other Charities previously mentioned, but in going through many of the trust deeds I have been struck with the fact that most of the benefactors were Alderman of the town, thus proving that in those days some of the best and wealthiest citizens took their part in the government of the town, and set an example to our merchant princes of to-day in giving some of their time to the welfare of the City, and also in granting a small share of their property to the cause of Charity, an example which has recently been worthily followed by Sir James Reckitt, Bart., the Rt. Hon. T. R. Ferens, the late Christopher Pickering, and last, but not the least, by the late Dr. C. A. Lee, who died in the year 1912, and who bequeathed practically the whole of his fortune, amounting to upwards of £200,000, for the purpose of building and endowing Rest Houses, that those who have become reduced from better circumstances may find a haven of rest. These Rest Houses are built on the Anlaby Road, occupying a site of $6\frac{3}{4}$ acres, and provide accommodation for 160 residents. The lay-out is in the form of a quadrangle, and the residences are planned in blocks of eight, with an entrance and staircase to every four sets of rooms. An imposing Reading and Recreation Room is provided; also residence for superintendent, etc. The Buildings were designed by the late H. T. Hare, Past President of the R.I.B.A., and are considered to be one of the most complete and

successful of modern Almshouse Buildings in the country, and are well worthy of a visit.

From the above, it will be seen that Hull is particularly fortunate in possessing so many Institutions, which from bygone centuries have enabled many worthy inhabitants to end their days in peace and contentment.

ENGINEERING AND SHIPBUILDING IN HULL

By J. DOWNS, J.P., O.B.E.

ALTHOUGH iron-founding and general engineering have been industries in Hull since very early times, the development of the steam engine and its application to navigation, together with the use of iron and steel in ship construction, have been the causes of the greatly increased importance of the engineering and shipbuilding trades amongst the industries of the city of Hull.

The oldest existing foundry and engineering establishment in Hull was established so far back as 1777. So early as the latest years of the eighteenth century, steam engines were constructed in Hull, and one of them was fitted into a vessel which was used as a pleasure yacht by George IV., then Prince of Wales. Fiernance and Ashton, who were the designers of this engine, each received at the hands of the Prince a life pension of £70 per annum as a reward for their ingenuity, and when the vessel was destroyed by fire, it was currently believed that the yacht had "been set on fire by persons who were afraid that such an invention would be injurious to their calling."

For more than seventy years, iron shipbuilding has been conducted on an important scale in Hull, and the repairing of engines and hulls of vessels in the various dry docks has provided employment for a very large number of workmen.

During the seventy years, which may be considered the duration of the period of iron and steel shipbuilding in Hull, the increase in the size of the vessels and the power of the engines is noteworthy. Thus, the first steam ship built in the yard of Messrs. Charles and William Earle, whose successors are the Earles' Shipbuilding and Engineering Company, Ltd., was 130 feet in length and of 100 tons register; whereas the latest steamer launched by this Company was 460 feet in length, and the gross tonnage was 8525.

Warships for the British and foreign navies, passenger steamers, cargo steamers, steam yachts, tugs and fishing vessels of all the types evolved for the service of the very important fishing industry, have been constructed in very large numbers in the yards and workshops of Hull.

It is now about forty years since the old wooden fishing smacks began to be superseded by iron vessels. Shortly after this introduction, the use of small steam engines for hauling in the trawls began to be fairly general. Little by little the fishing craft increased in size, and, by somewhat slow degrees, the power of steam was applied to the propulsion of the vessels.

Hull being already an important shipbuilding centre, and also a very important fishing port, it was natural it should take a leading part in this development. Several firms have been engaged in the construction of engines, boilers and hulls for fishing vessels. Two firms between them have already constructed over 200 sets of engines and boilers for steam trawlers.

It might not be out of place to remind our readers of the enormous value of the service rendered by this type of vessel and their gallant crews during the late war.

THE RIVERSIDE QUAY, HULL.



On account of Hull being the principal port of arrival for oil seeds, seed crushing has always been a leading industry in Hull, and again quite naturally Hull engineers have been very intimately connected with the various developments which have completely transformed the seed-crushing industry during the last seventy years, for it is not much more than that time since the hydraulic press was first adapted for the extraction of oil. This trade came into being as the whaling industry waned, as the result of the slaughter of the larger whales. In the early days of the application of hydraulics to the seed-crushing industry, numbers of Hull engineers were engaged in the manufacture of oil presses, and the supplementary machines which constitute a complete oil mill, but to-day there is only one firm extensively engaged in this industry in Hull.

In more recent years there has been a considerable demand for machinery capable of extracting a greater percentage of oil than is possible by hydraulic pressure, and to meet this demand machinery has been devised and manufactured in continually increasing values for the extraction of oil by means of chemical solvents.

No reference to special engineering productions in Hull would be complete without the mention of the manufacture of dredging machinery of the Grab type. It is safe to say that Hull-made grabs and dredgers are known in all the ports and docks of the world. In this connection, a mechanical excavator for the service of docks, harbours and rivers is believed to have been first employed during the construction of the Queen's Dock at Hull. The form of dredger with which Hull has been closely identified is a wide

variation from the Ladder Dredger, which removes mud, sand, etc., by the action of an endless chain of buckets.

The manufacture of ships' winches, donkey engines, etc., is being conducted on a very extensive scale, and special machinery required by important local industries for the manufacture of paints, starches, black leads, varnishes, etc., has been designed and constructed in large quantities.

EDUCATION IN HULL

By J. T. RILEY, D.Sc.(Lond.), *Director of Education*

THE affairs of the Education Authority of the City are administered by a Committee consisting, in accordance with the scheme approved by the Board of Education, of 27 members of the City Council and nine co-opted members, of whom two must be women.

On the "Appointed Day," the 30th September, 1903, the Education Committee took over from the School Board the administration of Elementary Education, and such work in connection with Higher Education as was conducted in the three Higher Grade Schools, and from the Technical Instruction Committee the control of the Technical College and the School of Art.

The last Triennial Report of the School Board shows that at the time of the transfer there were, excluding the upper departments of the three Higher Grade Schools, 133 departments in Board Schools, each under a separate Head Teacher, and 46 departments in Non-Provided Schools, for the maintenance of which the new Authority was responsible. It will be noticed that the ratio of Provided to Non-Provided Schools was unusually high when compared with the ratios existing in other towns.

The population was estimated to be about 250,000, and the number of children on the registers in November 1902, was about 48,350, including those in the three Higher Grade Schools. It was estimated that in 1903

the increase of school population was at the rate of about 1000 a year. This rate has not been maintained. The number of children over five years of age in the Elementary Schools increased continuously up to 1915 at the rate of about 500 per annum. Since 1915 the number has not varied greatly. It reached a maximum of 51,100 in 1920, and has since gradually decreased. It is estimated that the present population (August, 1921) is 200,808, and the number on the rolls of Elementary Schools maintained by the Authority, 40,668. It is not possible to compare this number with that obtained in 1902, as the Authority no longer admit children under five years of age except in four special cases.

Since 1903, twelve Departments of Non-Provided Schools have been closed with the consent of the Managers as being no longer necessary, six have been transferred to the Authority, and arrangements are in process of completion for the transfer of five others. The number of Non-Provided Departments at present recognised is 22, including two Departments which have been re-organised in one Department. Since 1903 the Authority have built the following new Schools :—Villa Place (four Departments), Selby Street (four), Beverley Road (one), Sidmouth Street (four), and Southcoates Lane (four). They have in addition built a new Infant School at Craven Street to permit of the extension of the Craven Street Secondary School, and a new School of two Departments in Saner Street to release accommodation for the extension of the Boulevard Secondary School. Considerable enlargements and reconstructions have been carried out at several Schools. Including the Departments transferred to the Authority and the Schools for mentally

and physically defective children, the total number of Departments in Council Elementary Schools is 154.

Manual Instruction for boys is provided in six* centres, which provide accommodation for 360 pupils at one time. The main part of the instruction is in woodwork ; but provision for metalwork is made.

The scheme of instruction in Domestic Work for girls provides for each girl three Courses of Cookery, each of half a day per week for six months, three Courses of Laundry Work, each of half a day per week for three months ; and a Course of Home Making five days a week for one month. The Cookery and Laundry Work are taken in specially equipped centres, of which there are sixteen for Cookery, eight for Laundry Work, and one for both Cookery and Laundry Work. The Home Making instruction is given in six houses which are rented and suitably equipped for the purpose. Members of the teaching staff are permitted to live in the houses on terms fixed by the Education Committee.

By an arrangement with the Baths Committee of the City Corporation, the Second Class Baths at three centres are placed at the disposal of the Education Committee during school hours on five days per week for the instruction of school children. Nearly 6000 boys and girls attend annually, of whom about 2000 learn to swim during the season. Certificates of competency are awarded in three grades, and School Competitions are held at the close of each season for Challenge Shields provided by the Committee. In the winter season the baths are covered with a suitable floor and converted into gymnasiums to which drafts of boys and girls are sent weekly for instruction in physical exercises.

Physical Training, including Drill, Organised Games and Folk Dancing, occupies an important place in the curriculum of the Elementary Schools. In addition to daily lessons taken in the schools, provision is made for each senior class to visit a playing field for a period of from $1\frac{1}{2}$ to 2 hours per week. Inter-school sports are held annually, and the teachers have provided shields for the boys' and girls' schools obtaining the highest number of points in the City, while framed certificates are awarded to the most successful schools in each district. Every effort is made to interest the parents in the question of physical training and, in addition to the admission of parents and others to the final school sports, public demonstrations of physical training have been given by school children at the baths during the winter months, and on each occasion the buildings have been filled to their utmost capacity. The Education Committee's playing fields are also placed at the disposal of the school football and cricket clubs for matches out of school hours. Evening classes for teachers in physical training and folk dancing have been held during the last few years with great success, and assistance has been granted to teachers attending summer and vacation courses in those subjects.

An Evening Play Centre was opened in 1918, where children may voluntarily attend in the early hours of the evening for the purpose of playing organised games under the supervision of teachers and students from the Municipal Training College.

The Authority maintain three special schools, one for deaf children in Osborne Street, one for mentally defective children in Malton Street, and one for physically defective children in Park Avenue. Children

are conveyed from various parts of the City to the two latter schools by means of motors and horse wagonettes. The school for physically defective children was opened in August, 1920, in the buildings previously occupied as a Girls' Industrial School, and much excellent remedial work has been performed there. Blind children are sent to residential institutions outside the City. A survey was made some years ago of the need for establishing special classes for partially blind children, and it was found that the number of such children in the City was not sufficient to warrant such special provision.

Medical Inspection is carried out at all Elementary Schools and certain Higher Education Institutions. The children from Elementary Schools are examined (1) on commencing school life, (2) between the ages of eight and nine years, (3) on attaining thirteen years of age or over if not already examined after reaching the age of twelve years. The pupils at Higher Education Institutions are examined on admission and at twelve, fifteen and eighteen years of age, with slighter inspections at each of the other years from twelve upwards.

Two Clinics have been established, at each of which is given treatment for minor ailments and dental defects.

Three full-time and seven part-time Medical Officers, two full-time Dentists, School Nurses, Clinic Nurses, Visitors, Attendants and Clerks have been appointed.

Three Employment Officers superintend children employed out of school hours. All children are medically examined before commencing employment and are periodically re-examined.

For some months, just over 10,000 meals per week have been supplied to about 2200 individual children. Dinners are furnished on the five school days each week at ten Canteens, which are mission rooms and halls rented in various parts of the City. The food is prepared at the National Kitchen, Hessle Road, and transported in bulk by motor to the various centres. The dinners consist of two courses, and the cost per meal works out at approximately 5d.

The powers and duties of the Authority under the law relating to school attendance and the employment of children are carried out by means of a Superintendent School Officer and eighteen Assistants, three of the latter being specially concerned with the supervision of the employment of children and street trading. Notwithstanding exclusions from school for medical reasons, the average percentage of attendance is about 90 at the present time. Habitual truancy has decreased enormously, and the number of boys under detention in Truant Schools and on licence has declined from over 400 in 1903 to 7 at the present time. The Authority originally maintained a Truant School for boys, but this has long since been closed. The Industrial School for girls in Park Avenue had accommodation for 70 girls, and was fully occupied some twenty years ago. In recent times the number of Hull girls detained in the School dwindled to 20, and the Authority decided to close the school and transfer the remaining girls to other long term Industrial Schools. The premises in Park Avenue have since been adapted for use as a School for Physically Defective, and provision has been made for remedial treatment. Since the closing of the Industrial School on the Training Ship "Southampton," boys committed to Industrial Schools

have been sent to various inland Industrial Schools. The number under detention shows a gratifying decrease. In 1914, the number was 178, to-day it is 74.

The Scheme of the Authority produced under the requirements of the Education Act, 1918, provides for the ultimate organisation of seventeen Central or Senior Elementary Schools for boys and nineteen for girls. The complete reorganisation devised involves the building of three new Elementary Schools and two new Secondary Schools, and can only be carried out when the restrictions on building operations are removed. In the meantime, it has been found possible to develop a Senior School for boys in the premises in Brunswick Avenue, recently occupied as a Girls' Secondary School. The school has very good laboratories and workshops, with special rooms for Geography and Art, and has accommodation for about 720 boys. A Central School for Girls has been organised in the Thoresby Street School, which was formerly a Mixed School.

The Capital expenditure on Elementary Education amounts to over £725,000, and the annual expenditure on Revenue Account to £457,000, of which about £202,000 is raised from the rates.

The Elementary School Staffs in May, 1922, included 171 Head Teachers, 814 Certificated Assistants, 219 Uncertificated Assistants, 12 Supplementary Teachers, 32 Domestic Subject Teachers, 17 Teachers of Handicraft and 15 Teachers in Special Schools.

Since the Appointed Day in 1903, great efforts have been made by the Authority to improve the facilities for Higher Education, and though these efforts are by no means completed, sufficient has been accomplished to bear witness to the generous policy adopted.

There are three Secondary Schools provided and maintained by the Authority. Some years ago the Authority acquired an excellent site of 50 acres adjacent to the Cottingham Road for educational purposes. The site was levelled and drained at great expense by labour provided by the Distress Committee of that time, and an extensive system of shrubberies was planted along the boundaries. The estate provides accommodation for the Training College for Teachers and the Newland High School for Girls. A considerable portion is allocated to the Technical College and certain Elementary Schools for playing fields. The Newland High School was built in 1914 at a cost of £41,000. During the war it was occupied as a V.A.D. Hospital, and provided excellent accommodation for that purpose. It was occupied as a school for the first time in the spring of 1920, and is now attended by about 500 girls. In addition to the classrooms, the school has a very fine Assembly Hall, large Dining Hall, Domestic Science Room and special rooms for Science, Art, Botany and Geography. The playing fields are adjacent to the school.

The other two Municipal Secondary Schools are Mixed Schools, the Boulevard in the West, and the Craven Street in the East, of the City. Both were originally Higher Grade Schools, but they have been considerably enlarged by the absorption of buildings previously used for Elementary Schools. The Boulevard is attended by about 520 and the Craven Street by about 480 pupils. Playing fields are provided. In the Scheme of the Act of 1918, it is proposed to use the Craven Street School as a Central School for boys, and provide two new Secondary Schools in the East of the City, one for boys and the other for girls.

The St. Mary's R.C. Secondary School is housed in premises adjacent to the Convent on the Anlaby Road. It is attended by about 250 pupils and is aided by the Authority by a Capitation Grant paid in respect of the children of Hull residents.

Situated in extensive and beautiful grounds near the junction of Spring Bank and Prince's Avenue are the fine buildings of Hymers College, a first grade school for boys, which was founded as the result of a great bequest of £160,000 to Hull by the Rev. John Hymers, Rector of Brandesburton, and formerly well known as a distinguished Mathematical Fellow of St. John's College, Cambridge. Unfortunately, through a flaw in the will, the full value of the gift could not be realized, but Mr. Robert Hymers, a brother of Dr. Hymers, to whom the estate had fallen, gave £50,000 to the City in order that the school might be founded. Opened in 1893, the school has carried out with success the intentions of the original bequest. In 1908 the Authority provided an additional building containing four Laboratories, a large Art Room, Lecture Room, and Workshops at a cost, with improved equipment, of about £6490. The Authority is largely represented on the Board of Governors, and defrays annually the adverse balances on Revenue Account. Over 450 boys now attend the school. There is provision for Entrance Scholarships from the Elementary Schools, and two Exhibitions tenable at Universities are offered each year.

The Hull Grammar School for boys was originally founded in 1486. The building in South Church Side was erected in 1583, and was in use for 300 years. The school had a high reputation throughout the greater part of the eighteenth century, but, having lost its

endowments, subsequently passed through troubled times. The present buildings in Leicester Street were opened in 1892. By the Scheme of 1896, amended in 1910, the school is governed by a Committee of the City Corporation, but the Education Committee have undertaken to pay the annual deficit on Revenue Account, and have provided additional buildings and equipment at a cost of about £5020, affording Classroom accommodation, together with Laboratories, Art Room and a Manual Workshop. Plans for further extension have been approved by the Education Committee and the Board of Education. As building cannot at present be undertaken, extra accommodation is provided by an Army Hut and rooms in a house in Leicester Street belonging to the Committee. The school is at present attended by about 500 boys.

The High School for Girls was started about thirty-two years ago by the Church Schools Company Limited. It is a quaint, old-world looking building outside, and is situated overlooking the Corporation Field in Park Street. The inside of the building is thoroughly up-to-date, and has large Classrooms, Laboratory and Assembly Hall. There are nearly 300 girls in attendance.

The work of Technical Education in the more advanced grades is concentrated at the Technical College, Park Street. The building was formerly used as a Home for Sailors' Orphans, but was purchased about twenty-five years ago by the Technical Instruction Committee and extensively altered and extended so as to provide suitable accommodation for instruction in Science, Commerce and Technology. The Day Technical Institute provides courses for students over sixteen years of age in the different branches of Engin-

eering, Building Construction and the Chemical Industries. There is a Junior Day School of about 490 boys over twelve years of age. Boys may join either the Commercial side or the side offering a preparation for those intending to adopt a career in Engineering, Building Construction or the Chemical Industries. Owing to the growth of the Evening Classes a considerable devolution of work, originally carried on at the College, has in recent years taken place. A Central Evening School of Commerce has been opened at the Brunswick Avenue Senior School, and in this and the Technical College the more advanced work in Commerce, Science and Technology is concentrated, the elementary courses being provided for in a number of Branch Commercial and Technical Schools in various parts of the City. The whole organisation is under the control of the Principal of the Technical College.

The demand for further accommodation at the Technical College has for some years been very urgent, and the Authority have had under consideration the best means of providing for the future needs of the City in Technical and Higher Education. A scheme was adopted for the purchase of a site of nearly 20 acres lying between the estate of 50 acres already in possession of the Authority and the Ferens Recreation Ground on the Cottingham Road. It was proposed that this site should provide accommodation for a new Technical College, with extensive departments for all branches of Engineering and the Building Trades, Chemistry and Chemical Industries and the allied Sciences. It seemed not improbable that these departments might ultimately be developed into a University College. In consequence of the difficult

financial circumstances of the times, the Board of Education were not able to grant the Authority permission to expend a sum of nearly £10,000 in the purchase of the site, and it appeared that the opportunity of acquiring an admirable site for the purpose in view would be lost. Fortunately for the Authority, the Right Hon. T. R. Ferens solved the difficulty by purchasing the site and presenting it to the Authority. A great debt of gratitude is due to Mr. Ferens, not only for this gift, but also for his many benefactions to the City.

Fishing and the various industries connected therewith are of immense importance in Hull, and the Authority for many years maintained in temporary premises a school for the men actually engaged in the fishing industry. Some years ago a site was acquired for a new school on the Boulevard, and an admirably equipped school erected. In addition to the instruction to fishermen given in day and evening classes to the men when on shore, a school for boys has been established. The fishing vessel owners have adopted an apprenticeship scheme giving very favourable terms, and preference will be given to the boys trained in this school. The course commences in April, and is a full day course extending over two years. No fees are charged at present, and the boys selected are required to pass a satisfactory medical examination and the Board of Trade eyesight tests before admission. Boys intending to go into the mercantile marine are admitted.

The greater number of boys intended for the mercantile marine are trained in the Navigation School maintained by the Brethren of the Hull Trinity House. The school has had a very successful career, and is

doing excellent work now in spite of unsatisfactory accommodation. It is the intention of the Brethren to build a new school as soon as favourable conditions for conducting building operations return. In connection with the school there is a department for adults, where men who have served the necessary periods at sea may be prepared for the examinations of the Board of Trade for certificates.

The School of Art is a fine new building erected and equipped by the Authority about seventeen years ago at a cost of £22,800. The work of the school is divided into seven departments : Drawing, Painting, Modelling and Sculpture, Pictorial Design for graphic arts and reproduction, including Technical Processes ; Industrial Design, including design for Manufacturing Industries and Craft Classes, Architecture ; and Teachers' Qualifying Classes.

Provision for the training of Teachers has been made by the erection of two Training Colleges. The Municipal Training College and its grounds occupy the front portion of the Cottingham Road estate. The buildings were erected in 1913, at a cost of about £46,000, exclusive of the cost of the site, and comprise, in separate blocks, the Educational Block, Gymnasium, Wilberforce Hall (residential accommodation for 100 students), Marvell Hall (residential accommodation for 50 students), Principal's House and Caretaker's Lodge. Originally the College was organised to accommodate 100 men and 50 women, but various influences, mainly due to the war, have resulted in a change of the scheme, so that at present only women students are admitted.

The Roman Catholic Training College, Endsleigh, occupies a fine site on the Beverley Road, and provides

residential accommodation for about 100 students. The grounds and gardens form a very attractive feature.

Under the Scholarship Scheme of the Authority, which entails an expenditure of about £7500 a year, a large number of Scholarships tenable at the various Secondary Schools and places of Higher Education in the City, together with University Scholarships, are offered annually.

The Authority have for many years offered loans on very easy terms to students desirous of assistance to enable them to enter Training Colleges.

Assistance is given to the University Extension Society and the Workers' Educational Association in furtherance of their courses.

The total Capital expenditure on Higher Education exceeds £176,000, and the annual expenditure on Revenue Account is estimated to be about £127,000, of which the rates will contribute about £55,000.

With the object of establishing ready means of access between the Education Committee and the teachers in their service, facilities for the interchange of views and opinions and closer co-operation in the work of education, a Joint Advisory Committee consisting of ten members of the Education Committee and ten members representing the whole of the teachers in the service of the Education Committee was recently established. The representatives of the Education Committee were appointed by that Committee, and the local teachers' organisations were responsible for the election of the teachers' representatives, due regard being had to the proportional representation of the different classes of teachers. Only teachers in the full time employ of the Education Committee are

THE BOATING LAKE, EAST PARK, HULL.



eligible for election or entitled to vote at the election. The functions of the Advisory Committee are purely advisory and not executive, and the Committee consider and advise on any matters pertaining to educational work and progress in the City which may be referred to them by the Education Committee or may otherwise be suggested for consideration. The Advisory Committee meet once every three months, and at any other time at the request of the Chairman or of any three members of the Committee. No decision of the Advisory Committee is operative unless it is supported by a majority of both the Education Committee members and the teachers' representatives present at the meeting.

OLD FARMING METHODS IN EAST YORKSHIRE

BY A. J. HARRIS
AND
W. H. COOPER

The following article is based on a series of lectures given by the authors at the University of Hull, and is intended to give a general idea of the old methods of agriculture in East Yorkshire. The first lecture was given in 1922, the East Riding Society, who invited the speakers, being present, and the second in 1923, the Lincolnshire Society, also present. The third lecture was given in 1924, the Hull Agricultural Society, and the fourth in 1925, the Yorkshire Agricultural Society, at the request of the Yorkshire Society, who were present. The fifth lecture was given in 1926, the University of Hull, and the sixth in 1927, the University of Liverpool, the Royal Agricultural Society of Great Britain, and the Royal Agricultural University, being present. The seventh lecture was given in 1928, the University of Hull, and the eighth in 1929, the University of Liverpool, the Royal Agricultural Society of Great Britain, and the Royal Agricultural University, being present. The ninth lecture was given in 1930, the University of Hull, and the tenth in 1931, the University of Liverpool, the Royal Agricultural Society of Great Britain, and the Royal Agricultural University, being present.

by Browns' of Hull in 1905, the last named edition being referred to rather fully by the present writer in an article on "Birds, etc., used for Food in the Sixteenth Century," in *The Naturalist* for February, 1906. From this we learn that the book is full of quaint and interesting entries relating to that period. Under "Direccions taken by my Lorde and his Conseill at Wresill upon Sonday, the xxvijth day of Septembre . . . in the iijth yere of the reigne of our Sovereigne Lorde Kynge Henry the viijth, concryng the Provision of the Cator Parcells as well as of Flesch as of Fysch which shall be provyded througheout the Yere," &c., we find several items, with prices to be paid, &c. Generally "yt is thought goode that Pygges, Geyses, Chekyns, Capons (a variety of the farmyard fowl), Hennys, Pegions, &c.] be bought for my Lordes Mees Mess]. Other delicacies purchased were Cunys [rabbits], Swannys, Pluvers jd. a pece - one penny each !], Cranys (- cranes,) xvjd. a pece ; Hearonsewys (Herons) xijd. (one shilling) a pece ; Mallardes ijd. (2d.) a pece. Evidently Teal was not thought much of, as we find that "Item it is thought good that no Teylles be bought bot if so be that other Wyldefowl cannot be gottyn and to be at jd. a pece." Also we find that "Item it is thought good that Woodcokes [woodcocks] be hade for my Lordes owne Mees and non other and to be at jd. a pece or jd. ob. three halspence] at the moste. The same applies to "Wypes" [Peewits], and "Seegulles" "so they be good and in season." These were to be bought at the same rate. Styntes (stints) "so they be after vj a jd." six a penny. "Quaylles [Quails] "at Pryncipall Feestes and at ijd. [2d.] a pece at most . "Snypes . . . iij a jd." [Snipe at 3 a penny]. "Pertryges [Partridges] at ijd. a pece yff they be goode." Red-

shankes [Redshanks], three halfpence each. Byters [Bitterns] xijd. one shilling [a pece so they be good. Fesauntes [Pheasants] were also to be a shilling each. "Reys" [Ruffs and Reeves] 2d. each; "Sholardes" [Shovellers] 6d. each; "Kyrlews" [Curlews] a shilling each. From the following entry it seems that peacocks could be obtained at a shilling each, but no pea-hens were to be bought: "Item Pacokes to be hadde for my Lordes owne Mees at Pryncipall Feestes and at xijd. a pece and noo Payhennys [pea-hens] to be bought.

Immediately following the above is an entry in more general terms: "Item it is thought good that all maner of Wyldfewyll wildfowl be bought at the fyrist hand where they be gottyn and a Cator [Caterer] to be appoynted for the same For it is thought that the Pulters [Poulterers] of Hemmyngburghe and Clyf [Hemingborough and Cliff] hath great advauntage of my Lorde Yerely of Sellynge [selling] of Cunys [rabbits] and Wyldefewyll."

"Wegions" were to be "jd. ob." [three half-pence] "the pece except my Lordes comaundment be otherwyze." "Knottes" a penny each; "Dottrells" were the same; "Bustardes," unfortunately, are not priced; "Ternes" were four a penny, and "Great Byrdes" [Fieldfares, Thrushes, &c.] four a penny and "Small Byrdes" [Sparrows, Larks, &c.] 12 a penny; Larkys [Larks] were also a penny a dozen. Seapyes [Oyster catchers] were "for my Lorde at Princypall Feestes and none other time."

Following the above are some general entries:—

Monthly. Item BACON FLYKES for my Lordes owne Mees Mr. Chambrelayn and the Stewardes Mees

bitwixt Candlemas and Shroftyde ells none except my Lordes comaundment be to the contrary.

Yerely.—Item that a direcccion be taken at Lekyngfeld [Leckonfield] with the Cator of the See what he shall have for every SEAM OF FYSCH thorowt the Yere to serve my Lordes hous.

Quarterly.—Item that a Direcccion be taken with my Lordes Tenauntes of Hergham and to be at a serteyn with theme that they shall serve my Lordes hous thrugheowt the Yere of all manar of FRESH WAYTER FYSCHE.

Yerelye.—Item it is thought good that there be a counnt made with the Cator by great for EGGES and MYLK for the hoole Yere if it can be so doyn what for a Gallon of Mylke and how many Egges for jd.

Yerely.—Item that from hensforth that theire be no HERBYS bought seinge that the Cookes may have herbes anewe in my Lordys Gardyns.

Yerelye.—Item a Warraunt to be sewed oute Yerely at Michaelmas for xx SWANNYS for th' expencez of my Lordes hous as too say for Cristynmas Day v—Saynt Stephyns Day ij—Childremass Day ij—Saynt Thomas Day ij—New Yere Day iij—ande for the xijth Day of Cristynmas iiij Swannys.

Yerely.—THE COPIES of the WARRUNTS to be sewed oute Yerely for SWANNYS for th'expencez of my Loordes hous after this forme followynge.

WELBILOVED I greet you well ande woll ande charge you That ye delyver or cause to be deliverd unto my welbiloved Servauntes Richard Gowge Countroller of my hous ande Gilbert Wedall Clarke of my Kitchinge for the use and expencez of my saide hous nowe against the Feest of Christynmas next comynge Twenty SIGNETTS to

be taken of the breed of my Swannys within my Carre of Arrom [Arram Carr] within my Loordeship of Lekingfeld within the Countie of Yorke whereof ye have the kepinge Ande that ye cause the same to be delivered unto theme or too oone to theme furthwith upon the sight hereof Ande this my writinge for the delyverey of the same shal be unto you agenst me and tofore myne Auditours at youre next accompte in this bihalf sufficient Warrant ande Discharge Geven under my Signet and Signe Manuell at my Manoure of Lekingfeld the xxijth daye of Novembre in the vth Yere of the reign of our Sovereign Loorde Kyng Henry the viijth.

To my welbiloved Servaunt the Bailiff of my Lordeship of Lekingfeld afforesaide and Kepar of my seid Carre at Arrom ande to the Undre Kepars of the same for the tyme beinge.

In the list of birds enumerated it will be noticed that the turkey is not mentioned. On p. 308 is a note bearing on the matter. "About the 15th [year] of Henry VIII. it happened that diverse things were newly brought into England, whereupon this Rhyme was made :

"Turkies, Carps, Hoppes, Picarell and Beere,
Came into England all in one year."

Amongst the fish required for food we find Stokfish, Saltfishe, Whyt Hering, Rede Herynge [red herring], Sprootis, or Sproxts [sprats], Salmon, Saltt Sturgion, and Saltt elis (or Elys) [eels].

There are also some interesting facts in reference to the number of deer in the parks at that period.

" For th'expensez of my Lordes hous bitwixt Alhollow-dey and Shraftide " twenty-five does were required, as under :—

Spofford	...	...	...	...	v
Great Parc of Topclyff	...	...	...	vj	
Little Parc of Topclyff	...	...	...	v	
Helagh	...	...	...	...	vj
Lekingfeeld	...	...	...	...	iij
Catton	...	...	...	...	ij
Newsham	...	...	...	...	ij

The Nombre of Does is—xxix.

From the same parks were also obtained 19 bucks, and also one from " Wressill"—the total " Nombre of Bukks " being " xx^{ti}. "

Bearing on the above is added a valuable " Account of all the Deer in the Parks and Forests in the North belonging to the Earl of Northumberland taken in this 4th year of Henry VIII. Anno 1512.

" IN YORKSHIRE.

" Topcliffe Great Park, Fallow-Deer	...	558
" Topcliffe Little Park, ditto	...	291
" Spofforth Park,	ditto	180
" Spofforth Wood,	ditto	43
" Wressel Wood,	(Red Deer, 42)	134
	(Fallow, 92)	
" Wressel Little Park, Fallow	...	37
" Newsham Park, ditto	...	324
" Leckinfield Park	ditto	249
" Catton Park, ditto	...	79

Similar details are given for the parks in Northumberland and Cumberland, exclusive of those in Sussex and other counties in the south.

I can hardly resist the following extracts relating

to breakfast "for my Lorde and my Lady," " Braikfastis of Flesh days dayly thorowte the Yere":— "FURST a Loof of Brede in Trenchors ij Manchetts j Quart of Bere a Quart of Wyne Half a Chyne of Mutton or ells a Cheyne of Beif boilid."

During Lent "my Lorde and my Lady" partook of "FURST a Loif of Brede in Trenchors ij Manchetts a quart of Bere a Quart of Wyne ij Pecys of Saltfysch vj Baconn'd Herryng iiiij Whyte Herryng or a Dysche of Sproits."

In 1641 Henry Best of Elmswell, near Driffield, kept elaborate farming and account books, which were published under the title "Rural Economy in Yorkshire in 1641," by the Surtees Society in 1857. This is rather a scarce work, but is, in many respects, unique. The agriculturalist may find in it, among much that is familiar to him, and much that is superseded by modern improvements, something that is new, and, possibly, useful. The country gentleman may glean some hints for the management of his estate, and discover that his comforts are as superior to those of his forefathers as his lands are more valuable. The antiquary will find here a curious and complete statement of the mode of life of the country gentleman of that day, down to his books, plate, and household linen; a faithful account of the condition of the labourer his work and his hire; a most accurate list of the prices of corn, cattle, and household goods. It is a pleasant thing after the lapse of more than two centuries, to rekindle the fire upon a deserted hearth, and to see before us those whom it once warmed, each coming in and going out, and labouring at his daily work. Few pictures are more faithfully drawn, or more authentic.

Among the headings to this work are such as the

following : Usual Markes of an Ill-Thrivinge Sheepe ; How to make on Ewe take another Lambe ; For Weaninge of Lambes ; For Washinge of Sheepe ; Directions for Cuttinge of Grasse and Tiftinge of Hay ; For Sellinge of Woll ; For Leadinge of Winter Corne ; For Trailinge of the Sweathrake ; Mowinge of Barley ; Leadinge of Barley ; Thatchinge of a Stacke ; Makinge and Orderinge of Honey ; Pullinge and Workinge amongst Pease.

A century or so ago saw the revival of practical interest in agriculture in the Riding, resulting in the formation of numerous societies, and the publication of treatises and volumes of varying kinds and of varying worth, by the then Board of Agriculture in London, and by private enterprise. One interesting book written by a member of a well-known local family was entitled "A General View of the Agriculture of the East Riding of Yorkshire," published by order of The Board of Agriculture, by H. E. Strickland, of Righton, Esq., and was printed for the author in York in 1812. It consists of seventeen chapters with the headings : Geographical State and Circumstances ; State of Property ; Buildings ; Mode of Occupation ; Implements of Husbandry ; Inclosing, etc., Arable Land ; Grass Lands ; Gardens and Orchards ; Woodlands ; Waste Lands ; Improvements in General ; Live Stock ; Rural Economy ; Political Economy ; Obstacles to Improvements ; Miscellaneous Observations, and a "Conclusion" dealing with Means of Improvement, and measures calculated for the purpose ; Agricultural Societies ; Weights and Measures ; and Tables of the Population of the East Riding of the County of York. Among the illustrations to this work is a map of the soils of the Riding, drawings of various tools of the

period (some being very quaint), methods of draining and embanking, methods of hanging gates, coloured illustrations of Vetches and Lentils, and methods of constructing Bee-hives.

There are also volumes, such as Marshall's "Rural Economy of Yorkshire" (two volumes), 1788, and many others.

In 1883 was published "Extracts from the Minutes of the Holderness Agricultural Society from the Formation of the Society in 1795 up to the Year 1850." This contains many valuable pieces of information relating to old time agricultural methods, for instance, on the 1st June, 1796, the question discussed was "What are the best means of improving and fertilising poor soils situated where lime and manure cannot (but at too great an expense) be procured?"

At a meeting held in Mr. Brown's house, in Hedon, on the 5th of March, 1798, the subject discussed was, "What proportion of labour in agriculture is now performed by oxen, compared with what is performed by horses in Holderness; and would a more general use of oxen as draught cattle be advantageous to the Holderness farmers, and what is the best mode of training and harnessing of oxen?" The general opinion of the meeting was that, to small farmers in particular, it would be very advantageous to use oxen more than they do. (Bearing upon this, the Museum possesses the remains of an ox-yoke, but on account of its age it is in very poor condition, but we have obtained a more modern example from Sussex which is practically of the same description.)

It was resolved that the following books be ordered of Mr. Brown, bookseller, in Hull: "Stillingfleet's Tracts"; "Rural Improvements by a Landowner";

and the "Transactions of the Society for the Encouragement of Arts, Manufactures, and Commerce," as published.

In 1814, one farmer stated he had formerly paid for a labourer 9s. the week, and he had his wheat at 6s. the bushel. Meat was then at 3d. the pound, and he had sold good fat beef at 3s. the stone. The comparative scale of wages and provisions was now as nearly as possible the same. A labourer will have 18s. the week and pay 12s. the bushel for wheat, and yet the number applying for relief from the poor rate is now as 10 to 1.

The Vice-President (William Spence, Esq.), observed that the calculation of the consumption of a quarter of wheat in the year was probably by all ages, and hence the farmers' servants would somewhat exceed the average. By Mr. Stickney's statement he rated the whole average annual cost of maintenance of a menial at £31 14s., of this

	£ s. d.
One pound and a half of meat ...	15 12 0
One quarter and a half of wheat	6 6 0
Suppose one quart of milk ...	1 10 0
,, two quarts of beer. ...	3 0 0
,, salt, pepper, vinegar, etc.	1 6 0
,, coals and candles ...	1 10 0
,, treacle and the like. ...	10 0
,, washing	1 6 0
,, sundries	14 0
<hr/>	
	£31 14 0

The William Spence referred to was the founder of Messrs. Blundell, Spence & Co., of Hull, a Fellow of the

Royal Society, and joint author of Kirby and Spence's four-volume Treatise on Entomology. Mr. Spence frequently contributed papers on such subjects as Insects which were harmful to Crops; The Finger and Toe Disease in Turnips; and other similar subjects, to the Holderness Society.

One could almost fill an interesting book relating to the information contained in these extracts.

In recent times, what with steam ploughs and improved appliances for threshing, reaping, irrigating, etc., and still more recently the introduction of petrol engines and machines has so transformed agricultural methods that many implements and appliances have in quite recent years come into entire disuse, and before very long the nature of these implements and weapons, and even their names, will hardly be known. For this reason, we have, at the Museum at Hull, always availed ourselves of any opportunity of securing specimens likely to become obsolete, regardless of size or material, and although it is not possible at present to have all these on exhibition, it is hoped that the time may come when sufficient room will be available, as the specimens are certainly as instructive and have as large a bearing upon the past history of the country as many other exhibits of possibly more intrinsic value.

AGRICULTURE OF THE EAST RIDING

By J. STRACHAN

THE East Riding, according to the Statistics of the Ministry of Agriculture, 4th June, 1921, exclusive of water, extends to 748,263 acres, of which 460,872 acres are arable and 208,485 under permanent grass. At that time there were 38,698 horses, 81,233 cattle, 341,082 sheep, and 76,080 pigs in the Riding. The average yields of its crops for the ten years, 1911-21, are given below, along with those for England.

Crop.	Area in Crop, 1921. East Riding.	Yield per acre average, 1911-1921.	
		For the East Riding.	For England.
Wheat	70,370 acres.	31 bush.	30·5 bush.
Barley	79,729 ..	31·5 ..	31·1 ..
Oats	90,728 ..	40·7 ..	39 ..
Rye	8,310 ..		
Beans	7,797 ..	25·8 ..	27·2 ..
Peas	6,053 ..	24·7 ..	25 ..
Turnips	66,716 ..	10·7 tons.	12·3 tons
Potatoes	14,211 ..	5·8 ..	6·2 ..
Mangolds	7,201 ..	14·7 ..	18·7 ..
Meadow Hay	40,348 ..	20·6 cwts.	22 cwts.

From the tables of statistics for 1921, a comparison of a hundred acres, exclusive of water, of the East Riding, with a similar average area of England and Wales, gives the following approximate figures :—

	East Riding.	England and Wales.
(a) Arable Land ...	61½ acres.	31½ acres.
(b) Permanent Grass for pasture and meadow ...	28 ..	30 ..
(c) Rough grass and non- agricultural land ...	10½ ..	20½ ..
Total	100 acres.	100 acres.

		East Riding.	England & Wales.
Grain produced per 100 acres (wheat, barley, oats, mixed corn, peas and beans)	145 quarters.	69 quarters	
Cattle kept	11	15	
Sheep kept	45	37	

It is seen that the East Riding is a rich Agricultural County. There is nearly twice as much land under the plough, and more than twice as much grain is produced ; there is only a third as much rough and non-agricultural land as in a similar average area in England and Wales ; the area under grass is lower ; the number of sheep compares favourably, but there are fewer cattle kept.

Like the other Eastern Counties, the sheet anchor of East Riding farming is corn growing.

The rainfall is low, the average being about twenty-six inches. This, to a great extent, accounts for corn growing being of major importance to the rearing and feeding of live stock.

Low rainfall results in clover grass and turnips not attaining the same degree of growth they would attain if the average rainfall were higher.* It may also be that those crops, and the straw from the grain crops grown under these dry conditions, are more fibrous and of less feeding value than they would be if the conditions were moister.

Whether the cause lies in the low feeding value of the bulky food grown on the farm, or the type of animal fed, or the method of feeding, the amount of feeding cakes and meals fed to cattle in the East

* Agr. Statistics (Ministry of Agriculture).

	Average Rainfall.	Average turnip crop, 1911-21.
East Riding (Pocklington)	26 in.	10.7 tons per acre
Lancaster (Clitheroe)	19 " "	4.7 " " "
Chester (Northwich)	31 " "	4.4 " " "
Westmorland (Appleby)	34 " "	10.1 " " "

Riding would cause surprise to farmers in some notable and favoured cattle feeding counties.

Throughout the Riding cattle are more or less regarded as machines for converting the large quantities of straw produced into farmyard manure. Straw is led daily into foldyards, usually open, with the exception of a small portion roofed for shelter to the cattle in rough weather. Aided by the excrements and trampling of the cake-fed cattle and the rain, the straw gradually rots. The farmer, not always satisfied by the speed and degree of the rotting by this method, often "hill" it in a field, or even turn it over in the foldyard to speed up the process and get the manure "short."

The type of cattle in demand for fattening in the foldyards during the winter, or on the permanent pastures in the summer, is a strong mature bullock, about $2\frac{1}{2}$ to 3 years old, with plenty of size and substance. Breeds in which the qualifications are quality and quick maturity are not in demand. Large numbers of cattle from Ireland and other parts are imported annually, as not nearly enough cattle are bred in the Riding to satisfy its requirements.

For ease in describing agriculture in the Riding, it will be best to divide it into three districts :

- (1) THE WOLDS.
- (2) DISTRICT LYING BETWEEN THE WOLDS AND THE SEA.
- (3) DISTRICT LYING WEST AND NORTH OF THE WOLDS.

DISTRICT NO. I.

THE WOLDS occupy over a third of the Riding. They are about half-a-mile wide at the Humber,

about twenty-seven miles wide in the north, and about thirty miles long. They rise abruptly from district 3, are high and undulating, and insensibly sink into district 2. Over a large area of the Wolds we find only a few inches of soil lying on the chalk. Here the system of farming involves corn growing, and wrapt up and inseparable from this, on account of the benefit from their treading of the soil, the breeding and feeding of sheep.

The sheep kept on the Wolds are mainly Leicesters. The Leicesters may be crossed with an Oxford Down Ram, in some cases, to get fat hoggs. Where a Wold farm has land stronger and deeper than the average, a Lincoln cross is sometimes introduced into the flock to give more size. The Lincoln seems to stand more crowding on the land than the Leicester; so a Lincoln cross seems to be an advantage where from the nature of the soil, one would expect bigger crops than the average.

There is very little permanent grass in this area. What there is is usually of very fine quality, but short in quantity. The four-course rotation is generally adopted, i.e., (1) *Turnips, Swedes, etc.*; (2) *Barley*; (3) *Clovers*; (4) *Wheat or Oats*.

On the better and deeper Wold lands this is sometimes extended to a five-course rotation by the introduction of barley or oats after wheat.

The clovers and the turnips, swedes, etc., except about one-quarter of the roots* pulled for the cattle, are eaten on the land by sheep. In this way the

* Four rows or roots in sixteen may be pulled for the cattle. Perhaps more rows may be pulled, perhaps less, depending on the conditions, i.e., the crop, the number of sheep to be wintered, etc.

whole field gets covered by the sheep droppings, and it also all receives a treading.

The straw from the corn crops is turned into dung during the winter by cattle in the foldyards. The foldyard cattle are usually fattened and all got rid of before the spring.

Scarcely any cattle are reared on the Wolds, the difficulty being to find them food for the summer. As already mentioned, there is little permanent grass, and the clovers are required for grazing by the sheep. The sheep are carried round the year by grazing clover in the spring and summer.

One, or perhaps two, fields on a farm may have two pounds or so of rye grass sown with the clover seeds to provide a bite of food earlier in the spring than can be got by clovers alone.* Breaks of rape or thousand-headed kale are usually provided for early autumn feed for weaned lambs and, later, for tupping ewes. This is followed by white turnips and, later, by swedes.

As to the method of manuring practised, the wheat usually gets most of the farmyard manure. The dung in a well-rotten state is spread on the clover in the autumn. In some districts the plan of getting this dung on early to encourage the clover, so that it may grow through the dung, is favoured highly as providing a green manuring as well as dunging when the whole is ploughed in.

In addition to the above, the wheat may occasionally get top-dressed with a quick-acting nitrogenous manure if conditions warrant. In the five-course rotation, the corn crop following wheat usually gets

* A difficulty to this practice is that wheat often does badly following clovers where some rye grass has been included. The reason for this is a little obscure at the moment.

top-dressed with a quick-acting nitrogenous manure, or this in conjunction with a little super.

Turnips are generally grown by the aid of artificial manures alone. In a good number of districts, however, the swedes do receive a little dung, but it is uncommon to find the white turnips getting any. Artificial manures, consisting principally of phosphates, are applied at the rate of three to six cwt. per acre. Quarter-inch bones are thought a great deal of by many Wold farmers, as they are lasting. Super, however, throughout the Wolds, is the principal source of phosphate. Bone meal is often mixed with it, especially for swedes. Steam bone flour is also used in mixtures. Slag is used to a limited extent. Fish manure in some districts is used, especially for swedes. A small quantity of quick-acting nitrogenous manure is seldom included in the farmers' mixture, although some of the "special turnip" manures greatly favoured on the Wolds may contain small quantities of it. Shoddy and slow-acting nitrogenous manures are occasionally included. A few use a little potash, usually Kainit; but this is the exception rather than the rule.

Turning now to items of interest in the crops and cropping, we find that Wold barley is of the highest quality. Wheat is usually pressed for. The varieties Victor and Little Joss are principally grown. The tendency is to find the former on the better Wold land, the latter on the poorer and Creeping Wheat on the thinnest and worst.

The turnips are usually drilled on the flat, by a Kirbymoorside drill, which places the artificials below the turnip seeds by manure coulters preceding the turnip seed coulters. The general times of sowing

swedes is from about 7th to 14th May. Early turnips and thousand-headed kale will be sown before the swedes. Turnips are sown up to about the 14th June. Rape for weaning lambs is sown about the last week in May, whilst that for tupping ewes may be sown up to 21st June.

Clovers, or "seeds," as they are called, are a difficult crop. They are often unsatisfactory, and often fail altogether. Partly on this account, and because it is cheap, and partly because it seems to germinate and grow more readily than white clover, a large proportion of trefoil (*medicago lupulina*) is included in the mixture. The feeding value of trefoil as the grazing season progresses rapidly diminishes until it may become so fibrous as to be prejudicial to the digestive organs of the sheep. A pound of ribgrass, which always seems to grow readily, is also commonly included in the mixture.

The uncertainty of the clovers and turnips makes them disturbing factors in Wold farming. There are often such big differences in yield from these crops from year to year as to involve the Wold farmer very often in awkward adjustments on his flock of sheep to the season's crops, especially as the price of store Leicester sheep, confined, as they are, to a restricted area, fluctuates markedly in sympathy with the goodness or badness of these crops. The uncertainty of these crops appears to make them weak links in Wold farming. Bad clovers and bad turnips means less to eat on the land, and this in its turn adversely affects the yields of the corn crops. Nobody seems, however, at the moment, to be able to suggest anything, either to strengthen those links, or even to substitute for the Wold rotations at present in vogue,

another rotation, or rotations that would pay better.

Unlike strong deep land, Wold land cannot be "pulled" for long, but wants frequent feeding. A farm in good heart will quickly fall away if neglected. Nothing is so good for Wold land as sheep treading, and sheep dung, and if a farmer can grow good clovers and good turnips, and keep plenty of sheep to eat them on, he need never worry on account of his corn crops.

DISTRICT No. 2.

The second district to consider is that stretching from the Wolds to the sea. The main features of this district are its flatness, its low altitude, and its system of open drainage.

The principal drainage systems are: (1) the Holderness drainage system, to the east of the River Hull; (2) the Beverley and Barmston system, on the west of the River Hull, and from Foston to Barmston; and (3) the Keyingham drainage system.

The soil in this district is mainly boulder clay, varying from light gravel to heavy tenacious soil. There is also a good deal of peaty land (Carr land) lying over the boulder clay. The main stretch of peaty land runs north and south to the west of Frodingham, Leven and Swine. Along the Humber side, and reaching various distances inland, is an important area of warp land.

With such a formation it can be imagined that the soil throughout this district is not very uniform. Also, from an agricultural point of view, we find the clays divided into reds, yellows and blues; the blue clay being much superior to the red and yellow.

Most farms are made up of land of very varied character, and there is, in consequence, no general rotation of crops in the district, but each farmer is, to some extent, a law unto himself.

On the heavier lands bare fallows and beans are a feature. A rotation might be: (1) *bare fallow*; (2) *wheat*; (3) *clovers*; (4) *wheat*; (5) *oats*; (6) *beans*. The beans might get 6-10 cwt. per acre of slag and the bare fallow dung. The oats might receive a top-dressing of a quick-acting nitrogenous manure.

On the lighter lands, a five-course rotation is common: (1) *turnips*; (2) *oats or barley*; (3) *clover*; (4) *wheat*; (5) *barley or oats*. A considerable amount of peas is also grown on the lighter land. On the richer arable lands, such as warp, but especially in Sunk Island, mustard for seed is often grown after a bare fallow and before wheat.

The peaty lands, or Carrs, as they are called, are somewhat subject to flooding. Spring wheat, sown about February or March, is preferred to winter varieties sown in the autumn, as the latter are on this land apt to be thrown out by frost during the winter. Mangolds often do well on those lands. Most of them are sour and in need of lime.

There is a considerable amount of permanent grass in this district, and much of it is excellent. A number of cattle are bred and reared, mostly of the non-pedigree shorthorn type, or some cross of this. Some Lincoln sheep are kept, as they are found more suitable for this district than Leicesters.

DISTRICT No. 3.

The third district consists principally of the alluvial land in the Vales of York and Pickering. Just below

the chalk escarpment overlooking the Vale of York is a succession of narrow and usually unimportant outcrops of Jurassic rocks, here and there covered with blown sand. The chalk escarpment overlooking the Vale of Pickering is, on the whole, a very poor type of agricultural land. The soil is very thin, and in places almost white when dry, except for the cloth of gold of flowering charlock during the summer.

Both the Vales occurring in this district contain heavy, wet clays, light blowing sands, and wet peat or Carr land.

The alluvial clays in the Vale of York are largely under permanent grass, usually set up in high ridges. This rather wet type of grass land is used more for store and fattening cattle than for milk cows. Under arable conditions it is difficult to work ; bare fallowing is often resorted to, and autumn-sown wheat and beans suffer frequently from water-logging in winter.

Very characteristic of this district are the lighter, sandier, alluvial soils, which, when well drained and owing to lack of fall draining is very difficult on some areas adjoining the Ouse and Derwent -form some of the best potato land. These light soils are very short of lime indeed in some districts ; they are known as "oats, rye and potato soils," because those are the only three crops at all reliable.

As a rule there is no fixed rotation ; most of the produce grown, of which the potato is the most important crop, is sold off the farm, and considerable quantities of town manure are imported by barge and applied for the potato crop. Lack of lime in these soils is not always due to neglect ; many farmers deliberately refrain from using lime for fear of "scabbing" of the potato crop. The King Edward potato

is largely grown, but of the heavier croppers, King George, Majestic, Great Scot and Ally are favoured.

On the still lighter blowing sands carrots become an important crop, but corn crops—even rye—are usually poor. Crops are often seriously injured in their seedling stage by the blowing away of the sand. The story is told of carrot seed being sown in one parish and the crop coming up in the next.

In addition to the alluvial soils there is a considerable area of glacial drift formed in the same way, and near the Ouse and the Humber artificially warped land. The warp varies somewhat in depth and texture, but is usually heavy, and requires care in working. It is extremely productive. The warp overlies either sandy or clayey alluvial subsoils; some of the warping done most recently has been on peat from which the top layers have been removed for such purposes as the making of peat moss litter.

A six-course rotation is often adopted on the warp, e.g., (1) bare fallow receiving farmyard manure; (2) mustard (*for seed*); (3) mangolds (*artificial manures alone*); (4) wheat; (5) clover or beans; (6) wheat.

Wheat, beans, clover and mangolds can be grown very successfully. Sometimes mustard is omitted and two crops of wheat taken after the mangolds. Oats can be grown; but barley is not always a successful crop on account of poor quality. Large areas of potatoes are also grown on these soils. The area under grass is usually not sufficient to graze the horses and other stock summered on these farms.

The Vale of Pickering drainage water has a long and very slow journey *via* the Derwent to the Humber. There is consequently a considerable area of badly drained land. The whole Vale is intersected by open

drains, which form most of the field boundaries. Hedges and trees, especially at the upper (eastern) end are conspicuous by their absence. Small clumps of Scots pine on infertile Carr land are characteristic.

The soils include recent river alluvium, limestone clays, sand and gravel (especially on the margin of the Vale) and peat (Carr land) filling in the hollows in the undulating sub-soil. The whole expanse is flat, and most of the farmsteads are situated on the higher, drier, and usually lighter land, and have a share, both of the alluvial flat and the drier land.

The four-course rotation is usually adopted, although much of the limestone clay land is bare fallowed. Most of the soils are short of lime, and cruciferous crops frequently fail owing to "finger and toe." The sheep population is much thinner than on the Wolds. Advantage has to be taken of dry weather for the eating on of roots on the low-lying land. The system of farming is similar to that on the Wolds, with such modifications as the substitution of rye for wheat on considerable areas of the Vale, and of bare fallow for roots on the heavier, wetter soil. There is a fair proportion of grass, but much of it, especially that in the peat soils, is of very poor quality.

The great drawback to agriculture in the Vale of Pickering is the difficulty in getting the water away. A late start in spring and the prevalence of fogs (sea-frets, etc.) in autumn means a short growing season, and that portion of the Vale of Pickering situated in the East Riding has a northern or north-eastern aspect.

PREHISTORIC REMAINS IN. EAST YORKSHIRE

EAST YORKSHIRE, with its sheltered Bay, the bold promontory of Flamborough to the north, the Wolds to the west, and the low-lying land of Holderness to the south, is exceptionally prolific in remains of prehistoric man, both of the Neolithic or New Stone Age, and of the later Bronze Age. A few traces of the men of the Early Iron Age have also occurred, the most notable instance being a Chariot Burial which I had the pleasure of excavating at Hunmanby a few years ago (see *Yorks. Arch. Journ.*, Part 76, 1907, and *Hull Museums Publications*, No. 47).

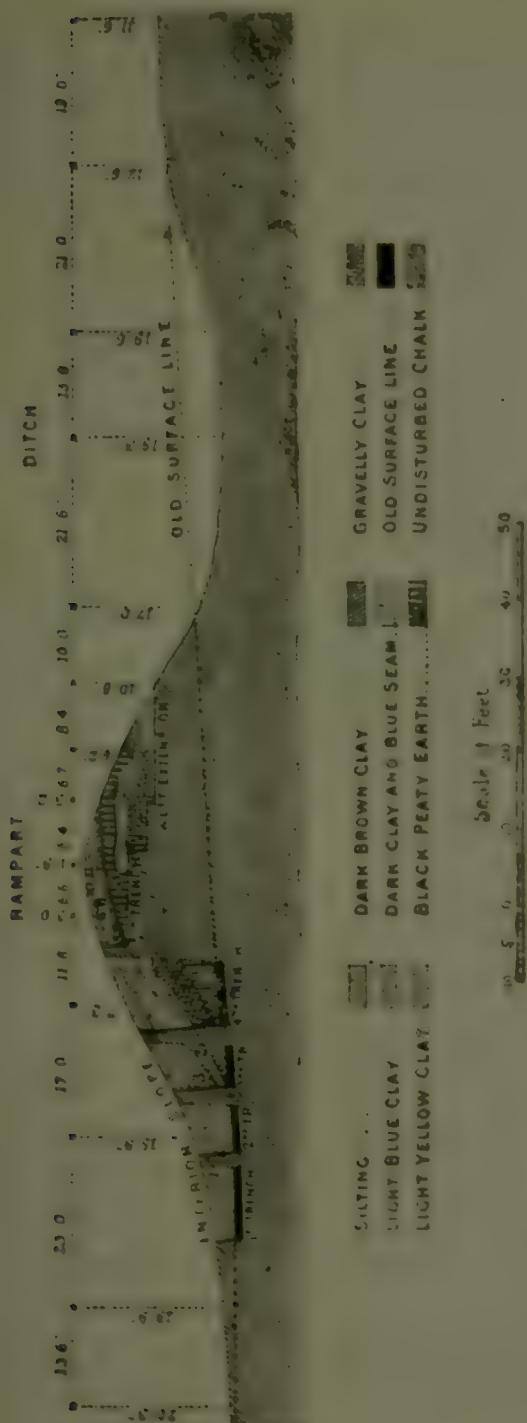
The relics of prehistoric man may roughly be divided into (1) Earthworks, (2) Barrows or Burial Mounds, (3) Lake Dwellings, and (4) Miscellaneous objects, principally implements, found on the surface of the ground.

With regard to the former, the most remarkable is the so-called Danes' Dyke, which, however, is of pre-Roman date. It stretches right across the triangular headland of Flamboro'; from north to south, like an enormous railway embankment. Its northern extremity is at a point known as Cat Nab, and it follows an almost continuous and straight line to the ravine near Sewerby. For most of the way it forms a prominent feature, accentuated by the growth thereon of trees. Its object evidently was to protect the area of

land, were due square stones, the size of a man's hand, like paving-stones laid on the other side of the trench forming simple protection from the sea. In recent years we have heard much of ancient warships, and in a period of the world's history have so many Roman ones, and so little else, that it is difficult to say with certainty what these belief of the greater number of the antiquaries of the West made them of the so-called Roman transport-vessels. And if Caesarian ships still floated and remained in command of the field and industry of a populous and powerful people long after all traces of the Roman legions had been wiped out, we may well suppose

With regard to the situation of our site at Cox Heath, on the south, it is very similar, but not quite, to the hill-side. On the north side of Headley Hill a little more than half of the material for the earthwork was removed. For the most part the ditch is not fully lined ground, but on the southern section, where there has been taken off the natural gravel, corresponding to the embankment itself, it is cut deep. The artificial bank protection does not extend beyond the top or ditch. As the ground is an whitish, 15 or 20 feet above the slope, erosion along the side of the hill will doubtless prove to be most rapid, and would certainly be especially liable protected at the top by a stone crackle.

The space between the north end of the earthwork and the old village wall is one or two breaks in the ridge, no evidently intentional, but part of the original defences. By means of these, low and little earth



SECTION OF STONEHENGE BANK AND DITCHES, DYSKE.

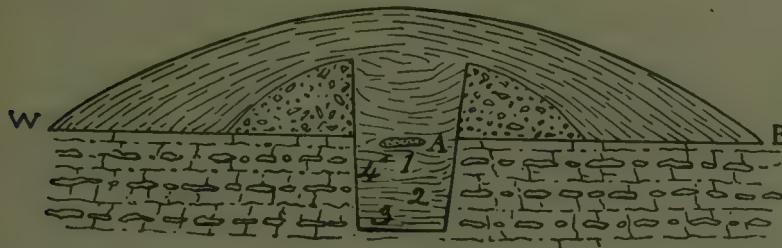
readily enter the enclosure in troublous times, and doubtless these small openings would be subsequently effectively barrièred.

As to the construction of the mound, naturally the material excavated would be used to some extent. But in an excellent section, cut right across, during the alteration of the road from Flamboro' station to the village, a few years ago, it was clearly evident that at least the upper part of the mound was constructed of sods of grass. Under favourable conditions, especially in wet weather, these can still be seen, the parallel lines of the roots of the grass being visible. As to the time occupied in making the mound and ditch, and the number of men employed, we have, of course, no knowledge. But when it is borne in mind that the only tools then available were picks made from deer-antlers, and basket-work or hide receptacles for carrying the material excavated, it will be understood that the labour involved must have been stupendous, and clearly this district was then much more thickly populated than it is to-day.

With regard to the date of this earthwork, it is certainly much earlier than the occupation of this country by the Danes. Its shape and method of construction demonstrate that it is not Roman, a fact supported by the absence of any Roman relics on its site. In considering this question, we cannot disassociate Danes' Dyke from the remainder of the entrenchments which form a net-work over the Wold area to the west, about 80 miles of which were mapped by the late J. R. Mortimer. Six miles away, and parallel with Danes' Dyke, are the Argam Dykes, a double set, not so massive, but much longer. Then the north, south, and west edges of the Wolds are

protected by earthworks, many miles in length, and sometimes in two, three, four, or five parallel series. In addition to the escarpments, the fresh-water springs are also protected by entrenchments.

In the same area, and associated with the earthworks, are the barrows, or burial mounds, several hundred of which have been examined. Of the date of these there is no question. The contained implements, weapons, and ornaments prove that the mounds belong to the Bronze Age.



SECTION THROUGH AN ANCIENT BRITISH BURIAL MOUND
"OR BARROW."

A grave has been dug into solid chalk and a mound has been placed over it.

It is evident that the barrows were built before the smaller entrenchments, as at Aldro' and other places, the direction of an entrenchment has been diverted in order to avoid a burial mound. And as the barrows are of the Bronze Age, it is clear that the earthworks cannot be earlier than that period. However, the intricacy and elaborate nature of the westernmost earthworks, together with the fact that they become more massive and simple in design as we travel eastward, give support to the idea that probably the Danes' Dyke is the oldest ; then the Argam Dykes were built, and a further series were erected as the builders travelled westward.

An earthwork of another kind but still extraordinarily substantial, is at Skipsea Brough, a few miles south of Bridlington. Here a large mound, 70 feet in height, covering four acres, is surrounded by a small ditch and rampart, and then some distance away are enormous earthworks in semi-circular form.

Close to these earthworks, at Ulrome, are the remains of a Lake Dwelling, one of the oldest in the British



ANCIENT BRITISH FORTIFIED MOUND AT SKIPSEA
BROUGH NEAR HOKNSAY

Isles. It was discovered by the late Thos. Boynton many years ago, while excavating a drain. On the side of the drain several oak piles and other material had been thrown out, and also some bones which had been artificially bored, apparently for the insertion of a wooden handle. A careful investigation was then made, with the result that it was soon ascertained that a platform of no mean extent had been discovered, right through which the drain had been cut. At a depth of about three feet a large quantity of twigs and

branches, covered with a layer of sand and bark, was reached, forming a floor, and this rested upon a platform composed of tree trunks laid together, side by side ; these were of oak, ash, willow, birch, alder, and hazel. The diameter of the logs varied from one to one-and-a-half-feet, and they were from 15 to 20 feet in length. The structure was held together by upright piles driven through the brushwood and between the trunks. At the outer edge of the platform some stakes were driven in a slanting direction, evidently with the view of better holding it in position. Another thick layer of brushwood occurred below the timbers, and this rested upon the peaty bed of the lake, two feet in thickness. Below this was the original gravelly bottom.

The platform measured 90 feet in length by 60 feet in breadth, and was connected with the land at each end by a causeway, which was about 20 inches below the top of the structure, a fact which seems to show that it was erected by the first inhabitants. There were two different settlements on the site.

The piles were principally of oak, and were usually three or four inches in diameter. There were two kinds, one with rounded and blunt points, while the others had clearly been sharpened with a metal instrument. It was also noticed that the blunt ones were those originally driven into the lake bed, the sharpened piles frequently cutting the timbers of the lower structure. This clearly indicated two distinct periods of occupation, represented by two platforms, one above the other, the latter having evidently been erected at a time when metal was in use, and upon a fascine dwelling which was of great age and much decayed when the new one was built. The finding of

a single bronze spear-head amongst the brushwood in the later structure also confirms this view, and indicates that it had been built by the Bronze-age Britons. A fragment of a jet arm-band was found on the same horizon. The implements in the lower dwelling consisted of scrapers, a saw, knives, etc., made of flint; hammer stones and anvils of stone; hoes,



A FOOD VASE OF CRUDE BROWN PARTHENWARE.
Found in the burial mound of an Ancient Briton,
near Driffield.

picks, and other agricultural implements, made of bone or horn.

The tumuli or burial mounds of the Wolds and district have been excavated by the late Canon Greenwell and J. R. Mortimer, with the assistance in some cases of the late Thos. Boynton; and a few which these gentlemen had not examined have been excavated by the present writer. These burial mounds have yielded an enormous number of interesting relics, including earthenware vessels of various kinds, crudely

decorated hammers, axes, spears, daggers, etc., of stone and flint; daggers, knives, etc., of bronze; and ornaments of jet, amber and other materials. The Greenwell and Boynton Collections have been distributed, but most of the important specimens at any rate therefrom can be seen in the British Museum, or the York Museum. The enormous numbers obtained by Mr. Mortimer, however, are now at Hull, the Mortimer collection having been purchased for the Hull Corporation by Col. Clarke.

The Neolithic implements have been described in detail by the present writer in the *Naturalist* for August, 1910, and *Hull Museum Publications*, No. 122, etc. The material from which most of the East Yorkshire specimens have been made is of a tough, dark-coloured flint, which is very different indeed from the light-coloured splintery flint which occurs in the Yorkshire Chalk. It is clear that the Neolithic implements are wrought from the far-travelled boulders of black flint which occur in the glacial clays and gravels, and which have been derived from the bed of the North Sea, or from the land on the eastern side thereof. It occurred to the writer that the early inhabitants of East Yorkshire would probably come to the coast for the material for making their implements, as the absence of natural exposures where the boulders could occur in large quantities would prevent these primitive people from getting their supplies inland. For years, consequently, watch has been kept all along the Holderness coast for anything approaching the appearance of a Neolithic workshop. While it is probable that such have existed, there can be little doubt that all traces of them have disappeared as a result of the erosion by the sea. Seeing that on an

average no fewer than seven feet per annum have been denuded, it will be understood that since prehistoric times a considerable tract of country must have been swept away, and that consequently the sites of any workshops, which would naturally be upon the cliff edge in those far-off days, are now some miles out to sea.

In the vicinity of Bridlington, the retreat of the land is nothing like so rapid, and where, as north of the town, the cliffs are protected by a natural break-water of solid chalk, erosion is comparatively slow. In such a situation, therefore, it seems highly probable that sites of the implement manufactories might exist. During the past few years I have had opportunities of examining the district, and have been successful in finding at least four distinct places where unquestionably primitive man made the crude flint weapons and tools with which he hunted and fought. Two of these sites are south of the town, and two north, one being quite close to Danes' Dyke.

The positions of these, the earliest of our known workshops, were first recognised by the enormous number of dark-coloured flint boulders, pebbles and splinters which occurred. Each occupied the top of a slight rise in the ground. A close examination showed that while a few of the larger pieces of flint were in their natural state, or only slightly chipped, others were in various stages of manufacture, from the split nodule with squared edges, to the small conical cores, chipped all round, which had been thrown away, simply because with their primitive tools our early ancestors had been unable to strike any further flakes off. In all directions were the spoilt flakes or "wasters," as well as "flake-knives," the edges of which are

remarkably sharp. Occasionally a piece of flint was found which had some flaw, or was in other ways unsuitable for making into a good implement, and had been discarded after several attempts had been made to put it to good purpose. In some cases it was clear that a large flint nodule had been entirely chipped to the core, as peculiarities in the texture of the flint could be detected in the dozens of pieces around. Of course, the best flakes would be made into finished implements and be taken away. In addition to the cores and flakes, however, a number of complete and well-finished Neolithic implements have been found, which had been accidentally lost, or for some other reason had been left behind. Among them are some types which are quite peculiar to the district, and, except in a few isolated instances, are not found in any other part of the country.

The commonest form of implement found was the oval or pear-shaped "scraper," the circular form which occurs in thousands on the Wolds to the west being only occasionally met with near Bridlington; and, so far, not at all on the sites of these workshops. The long scrapers average about two or two-and-a-half inches in length, by about one-and-a-quarter inches in breadth. One side is almost flat, just as struck from a nodule, and shows no secondary chippings. The opposite side, however, exhibits evidence of careful workmanship. Usually the end opposite the "bulb of percussion" (made in striking the flake from the block) is semi-circular in form, and rendered sharp by many small secondary flakings, skilfully made. In addition, one of the long edges is usually flaked in the same way. These are thought by some authorities to have been used for striking lights, after the manner of the flint-

and-steel of our great-grandfathers' days. By others they are considered to have been used for scraping the fat, etc., from the skins of animals.



NEOLITHIC HAMMER HEADS AND POUNDERS

Another type of weapon, which is by no means uncommon, is not so easy to account for, unless it has been used for making or straightening arrow and spear

shafts. These vary in shape, but are usually portions of large, well-struck, triangular flakes, the ends of which have been broken away. At first they may easily be passed over as ordinary "wasters," but a closer examination reveals the fact that at the ends, or sides, or both, there are small semi-circular notches with innumerable small flakings from one side only, thus leaving sharp cutting edges, just such as would be necessary for working an arrow shaft. Of this

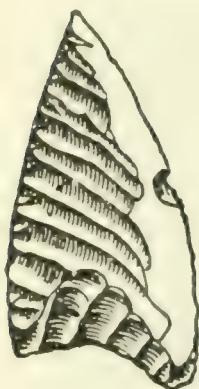


BARBED ARROW HEAD AND QUARTZITE RUBBING STONE.

particular type of implement (which has not hitherto received the attention it deserves) quite a number have been obtained.

Of the barbed arrow heads which have been found in such numbers in the Driffield and Fimber neighbourhood, not a trace has been seen, though more or less complete arrow points and small spear heads of the lanceolate or leaf-shaped type, have been obtained. Whilst the barbed arrow head is not nowadays common anywhere, its entire absence on the site of the four workshops is a little difficult to explain.

Perhaps the most remarkable find is a curved implement in the form of a boomerang, and is considered by the authorities at the British Museum to have been used as a sickle. It was found at Bempton by a labourer whilst ploughing. It most resembles one of the long, well-made flint axes, which are occasionally obtained on the Wolds, but it has a remarkable curve, or elbow, in the middle, which, of course, precludes it from being classed as an axe head. Both sides are carefully chipped to a sharp cutting edge, and one end is also sharpened after the manner of an axe.



RIPPLE-MARKED
ARROW HEAD.

There are two other important types of Neolithic weapons which are peculiar to the Bridlington district, a fact which would seem to show that the place was evidently of some importance in prehistoric times. One is a large triangular arrow or spear-head, sometimes with a projection at one corner. Its principal feature, however, is the extraordinary way in which the flakes have been struck off parallel to each other, and extend across the implement without a break. These regular flakings have resulted in the name "ripple-marked" being given to this class of implements. Oddly enough, as in the case of the curved flint weapons, the nearest approach to the Bridlington ripple-marked spear heads occurs in Denmark and Egypt.

The other weapon is a conical axe-head, usually made from diorite or other allied igneous rock, which does not occur *in situ* for many miles. Like the black and pink flints, the material for making these axe-heads



FRONT AND SIDE VIEWS OF PREHISTORIC BRONZE AXES
OF THE PALSTAVE AND SOCKETED TYPES.

has undoubtedly been obtained from the transported erratics in the glacial clays and gravels. Unlike the generality of East Yorkshire Neolithic axe-heads, these Bridlington examples have a point at one end, the broad end being rubbed down to a sharp cutting edge. They are circular, or nearly so, in section. Specimens of this type, which have been examined in various museums and collections up and down the country, have almost invariably proved to have been obtained in the Bridlington district.

THE ROMANS IN EAST YORKSHIRE

THE Roman occupation in East Yorkshire resulted in the aspect of the area being altered. True, as a rule, the native tribes lived together with their conquerors and benefited by the knowledge of the arts they possessed. The withdrawal of the Romans left the Britons better provided for than would have been the case had Julius Cæsar and his followers never appeared in our island. Unfortunately, there is a distinct gap in the history of England at the period immediately following the evacuation of this country by the Romans. The story is interrupted, and while we have proof of the hardships of the Britons, it cannot be overlooked that the information is but fragmentary. They unquestionably continued their daily routine (so far as the wars permitted them), after the manner taught by the Romans. Their weapons, implements, and pottery were modelled after the Roman type, and even their coinage followed the Roman pattern, the heads of the Emperors and the legends being fairly well copied. Several of these interesting pieces of money have recently been secured from South Ferriby, and may eventually add a lost chapter to the history of this district.

Of the Roman occupation of East Yorkshire we have much evidence; in fact, this district seems particularly prolific in relics of most of the important periods of our history.

Features which at once indicate Roman occupation are the roads which were then built, connecting one station with another. These, by the excellent way in which they were constructed, and by the direct course which they took from point to point, can readily be distinguished from roads of earlier or later periods. In some cases, as might be expected, when a suitable trackway was already in existence, connecting partly or wholly the stations selected by the Romans, were such roads utilised. A typical example occurs between Brough and York. One arm of the great Roman road leading from Lincoln to York reached the Humber shore at Winteringham on the Lincolnshire side, and in Yorkshire was continued from Brough to York. In Lincolnshire the road is typically Roman. It stretches in an almost perfectly straight line from Lincoln northwards, and is the same road that is used to-day. On a map it more resembles a railway than a roadway. On the Yorkshire side, however, the evidence, though conclusive, is not so convincing. In the first place the road, not having been built after the Roman fashion, does not exist so definitely, and in some places its course is doubtful. It evidently passes through South Cave, Newbald, and on to York, via Market Weighton. Before reaching the latter place a branch occurs, going through Warter towards Malton. From York towards Flamborough is an unmistakable road, but the entire area of Holderness east and south of these principal lines, whilst certainly frequently traversed by the Romans, does not contain specially built roadways. The frequent occurrence of the name "street" is evidence of Roman tracks, Humber Street and West Street and High Street being well known roads in the Riding.

With regard to the positions of the Roman roads in this district, I cannot do better than give the opinion of Mr. T. Codrington, in his "Roman Roads in Britain."*

" From Winteringham there was a passage over the Humber to Brough, where there are remains of a camp, and where on Castle Hill, in a field called 'The Burrs,' numerous coins and other Roman remains have been found. Warburton's map of Yorkshire (1720) shows a Roman road visible from near Brough eastwards to Rowley, and by broken lines to Wawne Ferry over the River Hull, and thence, turning almost at right angles in a south-easterly direction, towards Patrington. It must have crossed 'carrs' and fens not much if at all above the level of the sea, and *no traces of such a road now appear.*

" Towards the north, a Roman road followed the course of the present road through South Cave, to the north of which, at Drewton Bridge, it was found in 1851; a concrete-like layer, six inches thick, and five to seven yards wide.† It passed by South Newbald, through Sancton, and where the present road turns towards Market Weighton, it continued in the same direction along Humber Street and West Street to Londesborough Park. In 1736 the Roman road had lately been found in the park, 'very hard and of a material very scarce in that country.'‡ The paving was bared for the whole width of 2½ feet, and on it were to be seen the marks of wheeled carriages,§ and it is said that masonry is still to be seen where the road crosses the boggy ground near the ponds.|| The ridge

* 1905, pp. 150-153.

† *Gents' Mag.*, 1852, part 1, p. 483.

‡ Drake, *Eboracum*, p. 32.

§ Drake, "Letter to Stukely," *Surtees Soc.*, vol. lxxx., p. 350.

|| Rev. E. M. Cole, *Trans. E. Riding Antiqu.*, Soc. vol. viii., p. 44.

is marked on the Ordnance map for one-and-a-quarter miles through the park, and for half a-mile on the north of it over Nunburnholme Wold, from which a bridle road continues the line to Warter, where numerous Roman coins and ornaments have been found. From Warter the course is in a north-westerly direction along a wide, straight road for a mile and a quarter, and on to high ground on Coldwold. It then descends into Millington Dale, where an ancient paved road remains, and Roman foundations and pavements have been found. The ridge is traceable for about a mile further in the same direction on Millington Head, and again over Calais Wold to Garrowby Hill. A survey made in 1744 for the Earl of Burlington shows this part of the Roman road with considerable accuracy. After crossing Garrowby Street, which leads from York towards Bridlington, the Roman road northwards follows a line of entrenchments, and then the present road seems to mark the course of it, keeping on the high ground, and passing round the head of Scotton Dale, and thence in a straight line, followed for a mile by a parish boundary, to a high point on Leavening Wold. It then turns more to the north again, and passing through Burythorpe, joins the road from Stamford Bridge to Malton, about two miles and a half from the latter place. This line of road from the Humber keeps on the wolds, avoiding the low-lying moors which stretch between the wolds and the river Derwent; and from Millington Head to Leavening Wold the course of six miles is along the water-parting between the Vale of York and dales opening towards Holderness in which tributaries of the River Hull rise.

"The general line of Ermington Street northwards is taken up by the Roman road called Wade's Causeway,

extending to the coast near Whitby. There is, however, some uncertainty as to the connection, and it will be more convenient not to follow the road farther until it is approached from York.

"The course of a Roman road is shown by a dotted line on the Ordnance map, branching from the road which has now been followed near South Newbald, and joining the present road from Weighton to York, near Shipton. This, no doubt, indicates the road described in 1852 as being very visible in several places to the south of Market Weighton, and as far as the Mile House on the road to Holme.* The present road follows the course of the old road by *Thorpe le Street* for five miles, having a *parish boundary* along it for a mile and a half. The course of the Roman road was traced on in 1892 over Barmby Moor Common as a raised mound, and towards Black Dyke a layer of concrete was found at a foot below the surface, 15 feet wide and nearly a foot thick. The course onwards was marked by boulders in a straight line across the fields by Peacock House, Whinberry Hill, and High Catton Grange, pointing apparently to about a mile to the east of Stamford Bridge.† Warburton's map marks the road as visible and following nearly the course of the present road through Market Weighton to Barmby Moor Inn, and thence over the low-lying moors and across the river Derwent at Kexby to Dunnington and York."

Mr. Codrington, of course, refers to the *principal* roads, but as Roman villas and settlements existed in Holderness, it is only natural to assume that these would be connected by well-defined tracks which were

* *Gents' Mag.*, 1852, part 1, p. 83.

† Cole, *Trans. E. Riding Antiq. Soc.*, vol. vii., p. 38.

not necessarily of the nature of the chief lines of communication. Mr. Codrington's map shows the beginning of a road from Brough, which continues for a short distance in a north-easterly direction, but he does not find sufficient evidence to continue it so far as Patrington, which place has been thought by some authors to have been an important Roman station. This theory was based on the discovery of an alleged Roman altar—it is now in the Museum at Hull, and is clearly a seventeenth century sun-dial! The Rev. E. M. Cole* gives a map on which he shows a Roman road from Beverley through Bainton passing by the side of Wetwang and through Wharram le Street. While, unquestionably, an ancient road existed on the site indicated by him, it may be doubtful whether it is of Roman date, as Beverley, like Patrington, proves to be singularly free from Roman remains, notwithstanding the fact that during drainage operations almost every street has been excavated to a considerable depth, under the eyes of a keen Beverley antiquary.*

In addition to those already enumerated, it seems fairly clear that the Romans would have a road along the coast from some point on the promontory of Flamborough to Spurn. This supposition is supported by the circumstance that while in the low-lying parts of Holderness exceedingly few Roman remains have been found, coins, pottery, etc., have occurred in some numbers at Bridlington, Hornsea, Aldborough, Withernsea, Hoilym and Kilnsea. The fact that the

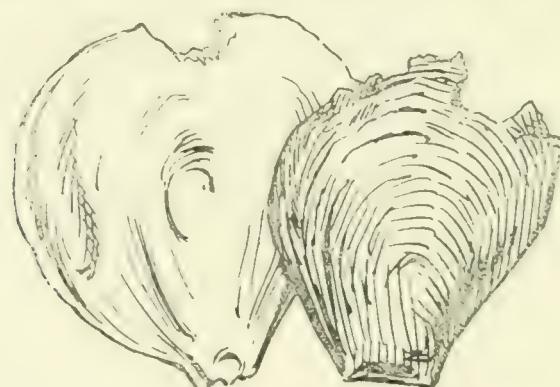
* "On Roman Roads in the East Riding," *Trans. East Riding Antiq. Soc.*, vol. vii., 1899.

* See Wm. Stephenson's "Notes on the Early History of Beverley."

coast-line is the highest part of Holderness also favours this view; but, seeing that our cliffs are denuded at the average rate of 7 feet per annum, it is highly probable that the actual road itself has long since been carried away by the sea, the relics that we find being what were lost or deposited on the west side of the roadway.

While on the flat lands east of the Wolds there is little proof of the occurrence of any large Roman community, such as existed at York, Malton, and Lincoln, it is clear that there were small stations at different points, some of which may have been mere guard houses at suitable positions on the coast, while others were possibly the summer residences of the more important personages. At Filey, many years ago, remains were discovered on the top of Carr Naze, just above the Brig, an elaborate description of which was given at the time, but too much importance was then attached to the discovery. What really existed was apparently a Roman coast-guard station. Bridlington, towards which a road from York seems to point, has yielded very few relics of this period, though possibly some earthworks in a field near Sewerby may have something to do with the eastern end of this Roman road. Roman coins of the second, third, and fourth centuries have been found at various places along the coast, and Aldborough, where there are some curious irregular mounds and ditches near the cliff, has yielded fragments of pottery of Roman date. At Ulrome, near the well-known British lake-dwelling, the late Thos. Boynton obtained some bushels of fragments of Roman pottery, and also a very fine and perfect store vase of Romano-British ware, which is the largest vessel of that period that I remember to have

seen.* At Easington, in 1875, a discovery of some importance was made, which I described in the *Antiquary* for January, 1905. Exposed in the cliff on the sea-shore at Easington Lane End—the site of which has long since been washed away—were sections of trenches of dark earth, which contained bones, oyster shells, and other odds and ends. Excavations resulted in almost complete dishes, basins, and numerous fragments of vases of Roman date being found,



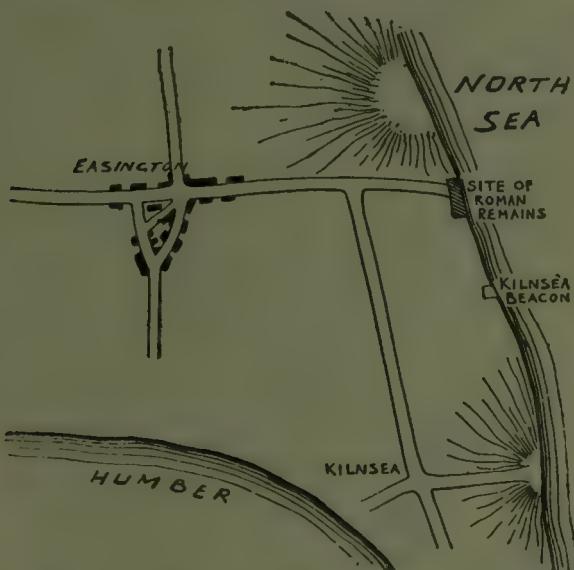
OYSTER SHELLS FROM THE ROMAN REFUSE
HEAP AT EASINGTON.

Showing the method of opening by nipping a piece out of the front.

together with quantities of oyster shells and bones of various animals. Since then more Roman and Romano-British vessels have been obtained at Easington and Kilnsea, though principally on the Humber shore; as well as a large number of silver and bronze coins and other relics. On the Humber side just before reaching Easington, some V-shaped trenches yielded to the present writer, fragments of pottery, oyster shells, bones, and other refuse, and the sea and the Humber

* We have since obtained a similar vessel from Burstwick in Holderness, which is figured on page 210.

are constantly exposing further specimens. The distances between the various trenches in the Easington district are considerable, and from the objects found it would appear that a small though not unimportant station existed there. From its geographical position commanding the entrance to the Humber, and with an outlook to the sea, we should naturally expect that



SKETCH-MAP SHOWING THE SITE OF THE ROMAN REMAINS FOUND AT EASINGTON.

the Romans would have taken advantage of such a place as Spurn.

From North Ferriby, on the Yorkshire side, I have recently obtained a quantity of Roman and Romano-British pottery, including some of the well-known Samian ware, and have also succeeded in securing examples from Burstwick, South Cave, Brough, Market Weighton, Pocklington, and other places. A single Roman or late Celtic vase was found on the outskirts of Hull a few years ago, the only Roman relic within the City boundary. Major Chichester Constable

has some more or less complete cinerary urns, etc., of Roman date which had been found at Halsham while excavating for the foundations of the mausoleum of the



LARGE ROMANO-BRITISH STORE VASE FOUND AT BURSTWICK.

Constable family many years ago. This find is interesting, as showing that the identical spot chosen for the resting-place of the Constables was that selected in Roman times to receive the cremated remains of some of their dead.

Of value as throwing a side-light on another aspect of the Roman occupation was the interesting discovery made at Harpham, near Driffield.* In the centre of a large field where no Roman remains had previously been suspected, some small tesserae were unearthed by the plough. Subsequent excavations revealed the foundations of what was apparently a summer residence, built about the year A.D. 300, and probably used by some of the officers from the important Roman station at York. Excavations indicated that at the time of the evacuation of this country by the Romans, the building had been left to decay ; the walls collapsed, the roof fell in, and the whole heap of ruin, gradually levelled, was covered over, and much of it went to form part of the soil, which has been ploughed over and over again during many recent years. The pavements forming the floors of the rooms and corridors, however, were fairly intact. They had various intricate designs, one being in the form of a maze, made principally of tesserae of sandstone and chalk, the two materials forming an agreeable contrast. The sandstone was obtained from the West Riding, and the chalk from the beach near Bridlington. The walls had been built of chalk rubble, had been plastered on the inside at various times, and were decorated by various colours, some of which are still preserved. The roof was of thin slabs of West Yorkshire sandstone, which were held in position by large-headed iron nails. There were traces of fire on the pavements, and the remains of various earthenware vessels, and coins of Tetricus, Victorinus, and Gallienus were found, which help to date the building. There was evidence of a hypocaust, or heating chamber, and amongst the other finds were

* Hull Museum Publication No. 23.

several oyster shells, beads, a fine three-sided arrow point, and objects of iron, lead, and bronze. There were no earthworks nor other indications of the villa at Harpham being more than a pleasure resort, possibly only occupied in the summer.

Of all Roman antiquities, coins are perhaps the most interesting, and they are certainly by far the most numerous. From the material of which they are made and the legends which occur upon them, the information they give can generally be relied upon to be accurate. Possibly the most marvellous thing in connection with them is their extraordinary abundance. From one locality alone on the Humber shore, within a radius of half-a-mile, between 3000 and 4000 were picked up by a local enthusiast. These are now at Hull. Many of them were struck in London or in other parts of this country. At Nunburnholme, in 1835, about 3000 were found in a vase. This collection appears to have been divided between the museums at York and Hull. At Brough, Swine, and various other places, coins have been turned up in large numbers. In many cases they are the only evidences of the Romans having been in the localities in which these have been found, the inference being that at one time or other during the Roman occupation this district was fairly well over-run.

Many other relics of this period have been ploughed up or in other ways brought to light in the district in recent years, but it is now impossible to enumerate them all. I may perhaps just mention two of the most striking. The first is a pair of stili, elaborately ornamented, found, together with some Roman coins, at Brough.

The other find consists of a pig of lead which was unearthed near South Cave in 1800. This pig has

upon it an abbreviated Latin inscription, the English translation of which may be read as follows :—“ (The lead of) C. Julius Protus, British (lead) from Lutudae, prepared from silver,” and indicates that traffic then existed between Derbyshire and the East Coast. It was quite possibly en route to Brough for shipment, in the same way as several pigs of lead found near Chester were, when lost, probably on their way to the West Coast for shipment to Italy ; the lead mines of Britain then being very valuable and considerably worked.

ANGLO-SAXONS IN EAST YORKSHIRE

OUR direct ancestors, the Angles, came from Angle-land, an area now represented by Schleswig-Holstein, situated in the centre of the peninsula between the Baltic and the Northern seas. To the north lived a kindred tribe, the Jutes, after whom Jutland gets its name ; and during the fifth century, according to Green, the Angle, Saxon and Jute were “ being drawn together by the ties of a common blood, common speech, common social and political institutions, each of them was destined to share in the conquest of the land in which we live ; and it is from the union of all of them, when its conquest was complete, that the English people have sprung.”

These are the people who for so long have been known by the more or less incorrect name of Anglo-Saxons, but this name has become so rooted in history that to attempt to abolish it would be inadvisable, and would certainly not be successful. In this district we have many traces of the Anglian invasion and the subsequent colonization. Several of the existing villages occupy precisely the sites of the first clearing made by the Anglo-Saxons. The names of those villages, in some instances slightly modified, are those which were given by these people : our local dialect contains numerous proofs of Anglo-Saxon origin or influence, and in addition, there is, in the churches,

and in the innumerable relics dug up from time to time, unimpeachable testimony of the arts and religion of these our forefathers. There are also local references in the Saxon Chronicle and in Bede's Ecclesiastical History.

Just across the water, at Barton-on-Humber, is a delightful Anglo-Saxon church, much of which is of the strongly fortified character, as originally built. In the church of Aldborough, let into the wall, is a circular stone with Runic characters upon it, which have reference to Ulf, the Danish possessor of Aldborough, who also held other lands in the district. The inscription is to the effect that "Ulf commanded this church to be erected for the souls of Hanum and Gunthard." The present church, however, is obviously not that which Ulf commanded to be erected, but is of later date. The stone has been taken from an earlier building, and put in the present church, in an absurd position—upside down—by some later builder who evidently could not read it. Other of our churches contain proofs of Anglo-Saxon influence.

Perhaps the most interesting of all is the reference to Goodmanham in the Venerable Bede's "Ecclesiastical History of the Anglian People," a work first published on the Continent, but which has since been printed many times in this country. The original MS. from which these various editions have been produced is in Latin, and contains notes in a somewhat later hand, from which it would appear that the volume was probably copied from the author's original MS. in the year A.D. 737, two years after Bede's death. This volume contains a mine of interesting information relating to our early history, and to the wars between the Britons and Saxons. The following translation of

extracts under the date A.D. 627, gives a little insight into the early history of Godmundingham, or Goodmanham, as it is known to-day, and shows that a heathen temple existed there before the present Christian edifice : “ ‘ I advise, O King, that we instantly abjure and set fire to those temples and altars which



GOODMANHAM CHURCH, ONCE THE SITE OF A
HEATHEN TEMPLE.

we have consecrated without reaping any benefit from them.’ In short the king publicly gave his license to Paulinus to preach the Gospel, and, renouncing idolatry, declared that he received the faith of Christ ; and when he inquired of the high priest who should first profane the altars and temples of their idols, with the enclosures that were about them, the latter answered : ‘ I, for who can more properly than myself destroy those things which I worshipped through

ignorance, for an example to all others, through the wisdom which has been given me by the true God ?' Then, immediately, in contempt of his former superstitions, he desired the king to furnish him with arms and a stallion ; and mounting the same, he set out to destroy the idols ; for it was not lawful before for the high priest to carry arms, or to ride on any but a mare. Having, therefore, girt a sword about him, with a spear in his hand, he mounted the king's stallion and proceeded to the idols. The multitude, beholding it, concluded he was distracted ; but he lost no time, for as soon as he drew near the temple he profaned the same, casting into it the spear which he held ; and rejoicing in the knowledge of the worship of the true God, he commanded his companions to destroy the temple, with all its enclosures, by fire. This place, where the idols were, is still shown, not far from York, to the eastward, beyond the River Derwent, and is called Godmundingham (or, 'The home of the protection of the Gods ') where the high priest, by the inspiration of the true God, profaned and destroyed the altars which he himself consecrated."

From the preceding extract we have some idea as to the period in which idolatry was ousted by Christianity.

A work has recently been issued by the late Thos. Wm. Shore, on the "Origin of the Anglo-Saxon Race." The author quotes the dislike or jealousy between village and village as the survival of a trait in the character of the original Anglo-Saxon. He says :— "Even in that great district which forms the borderland between Yorkshire and Lancashire, stories are still current of the reception which the inhabitants of the Yorkshire valleys sometimes met with when they

crossed the moorlands into Rossendale in Lancashite. The traditional reception of such a stranger was to call him a foreigner, and to 'heave a sod at him.' Such an old local tale conveys to us an idea of the isolation that must have prevailed among some, at least, of the neighbouring settlements of the Old English, especially when inhabited by people descended from different tribes, and not comprised within the same hundred or area of local administration."

At Hunmanby we have an instance, the Anglo-Saxon name of this village being Hundemanbi. Here a chief or headman named Hundeman or Huneman was probably a Frisian of the Hunni or Hunsing tribe, and the people who settled with him were probably his family or kindred. In a paper read to the Hull Literary Club on March 28th, 1881, on "Some Place-names of the East Riding of Yorkshire," by Thomas Holderness, the author pointed out that it was singular that "in a tract of country, once probably thickly populated—the wolds by the Brigantes and Holderness by the Parisi—all our place-names are Anglo-Saxon or Scandinavian, with a very small number of possible exceptions. Most of them point out some peculiarity of appearance, situation or surroundings, such as hills, dales, burns, woods, trees, lakes or meres, the latter in Holderness generally called 'seas.' In some instances the colour of the land, or the swampy position of the place, have lent an element in fashioning their names." "Ridings" into which the county is divided, is a purely Scandinavian word, "thriding" meaning a third. We have not time now to deal in detail with Mr. Holderness's paper, but one or two items may be mentioned. Drypool, which in Domesday is Dripold and Dritpol, is probably Anglo-Saxon, from Dryhten,

a lord, which in compound names was abbreviated to Driht, and the initial syllable in Driffield may be of a similar origin. Sculcoates is thought to have been possibly a portion of the reward bestowed on Jarl Skule by Athelstan, for his bravery in the Battle of Brunanburh. *Mr. Holderness's method of dealing with place-names is so ingenious that I may be pardoned if I quote one paragraph from his interesting paper :—“ Perhaps we can form the best idea of the origin of place-names by picturing to ourselves the whole of the East Riding entirely devoid of human habitations. Let us then, in imagination, glance at the map as an entire blank, and trace the origin of a few of its towns and their names. Six miles north-east of Driffield, is a cyl—(pronounced ‘kil’)—well, spring, and near it an Anglo-Saxon erects a ham (house), which afterwards became the village of Kilham. This cyl flows down to the river Hull, and a Scandinavian encloses a tun on its banks, near a foss (waterfall), and the place afterwards becomes the village of Foston. On some low ground, in the parish of Kilnwick, probably brackens (ferns), formerly abounded. Here a tun was enclosed, and it took and still retains the name of Bracken; and there is another farm, near Bridlington called Brackendale, and a place near Selby called Brackenholme. Near to Sunk Island there probably was once a lake or mere, into which the salt water from the Humber flowed; a house was erected on its margin, and it took the name of Saltagh, from Anglo-Saxon ‘ea,’ water. In the parish of Howden is a piece of land which probably grew abundance of bents, bent-grass, or bennets. A house was erected on this land, and the house (now village) took the name of Bentley, from Anglo-Saxon lea—a pasture. Pursuing this

course still further, our skeleton map becomes pretty thickly dotted with place-names. Then come those of a more modern class. Near to Wressel a house was erected, probably a thousand years ago, and it was called the New House, and the village retained that name when the Domesday survey was taken, but it is now corrupted to Newsom and Newsholme. A Scandinavian erects a grand house, also near Wressel, which, from the fact of its being two stories high, is called a *loft-hus* (pronounced lofthouse). This house afterwards becomes the village of Lofthouse. This reminds us that in those days the generality of houses were of one storey only. There are also seven Newtons in the Riding; all of which are the new houses, or newly-enclosed portions of land, for the word *tun* does not necessarily imply the existence of a house, but merely a portion of land fenced round. Then we have two villages of Newbald, each of which is really *New House*, or rather *New Building*. The two villages of Newland, one near Cottingham and the other near Howden, and New Fields, near Howden, are most probably land reclaimed by drainage or embankments from the waters with which they were formerly inundated, and the lands had given their names to the villages."

In this way the whole of the district was dealt with in detail.

In the paper on "the Vowel Sounds of East Yorkshire Folk-Speech," by the Rev. M. C. F. Morris, we get still further information on this interesting subject; and Mr. W. H. Thompson's "Speech of Holderness in East Yorkshire," Mr. J. Nicholson's valuable "East Riding Folk Speech," and the "Holderness Glossary," published by the English Dialect Society in 1877, all

refer to this subject. Another paper, by J. R. Boyle, on the "Danes in East Riding," has considerable bearing upon this part of our subject.

In the last-named paper the author points out that, leaving out of account the purely military ways of the Romans and the comparatively few British roads, our existing road system is due to the Anglo-Saxons. Their roads led from one English village to another, and each village was a centre from which the roads radiated.

In referring to the various local areas in which Anglian or Anglo-Saxon remains have been discovered,



TOYS, CONSISTING OF A PAIR OF BRONZE TWEEZERS,
KNIFE, AND SHEARS, FOUND IN THE BURIAL
URN OF AN ANGLO-SAXON CHILD.

it is a remarkable fact that in almost every instance the discovery of the remains of these people—and they are very numerous—has been by accident. The houses in which they lived, their roads and earthworks—if any—have gone; their cemeteries are unmarked by mound or monument, and while the graves have been frequently found in the vicinity of existing villages, their exact position was unknown until unearthed by spade, plough or pick.

Occasionally the relics are found during quarrying operations for gravel, sand or chalk; in draining or building. Sometimes a slightly elevated ridge or mound has been selected, at others an ancient British barrow of the Bronze Age has been used again as an

Anglo-Saxon burial place, though, as the later burials were shallow, they have not, as a rule, interfered with the earlier interments. The persistency with which a particular site is used in this way is remarkable; at Fimber, for instance, excavations have shown that the same large mound upon which the church is built was originally the burial place of a British chief; later the Anglo-Saxons used it for a similar purpose—then



BURIAL URN OF AN ANGLO-SAXON CHILD FROM SANCTON.

This contained the toys shown in the previous illustration, as well as cremated bones.

in Christian times the present church was erected, and modern men and women are buried in the same ground. At Garton and Kirby Grindalythe the present churches occupy Saxon sites.

The small quaint church at Speeton was stated by the late J. R. Mortimer to be built upon a British barrow.

As a contrast to this method of selecting elevated areas, Saxon cemeteries occasionally occupy hollows between parallel British earthworks. One or two of

these, excavated by Mortimer, were only revealed while he was examining the structure of the older earthworks.

Often the Anglo-Saxons were buried wrapped in their garments. In the absence of weapons or ornaments these can usually be distinguished from the earlier British burials by the fact that they occur at full length, or with the knees only slightly bent;



ANGLO-SAXON CINERARY URN FROM SANCTON.

while the Britons generally have their knees brought up towards the chin.

Like the Britons, too, the Angles occasionally practised cremation, and the burnt remains were carefully collected and placed in urns, and were buried in rows at fairly equal distances apart, after the manner of the ordinary Anglian burials.

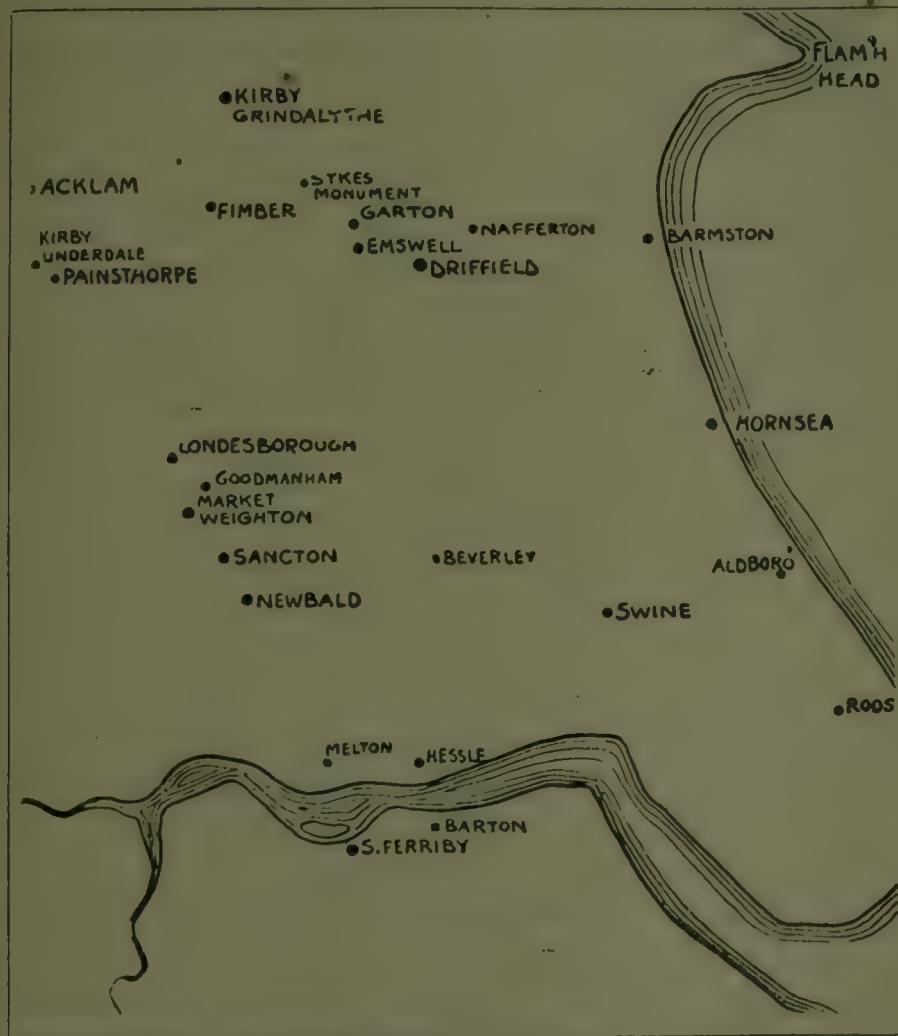
The Anglo-Saxons found in this area may be divided into two classes, heathens and Christians. The heathen believed in a future life, and when they died, had

buried with them tools weapons, ornaments, various household utensils and even occasionally musical instruments; so that in the next world, or after their long sleep, they should be provided with the necessary objects to enable them to live and love and sing and quarrel and fight again as they had done before.

The Christians, on the other hand, who presumably also believed in another world, evidently expected that all they required would be already provided for them; consequently, on their death, their possessions were shared among their relatives and friends. Needless to say, when an antiquary is digging among Saxons, he wants heathen Saxons, not Christians, and as I have met with a fair number of both kinds, I am bound to say that as a result, I am able to give very little information about the Christian Saxons; their bones show that they were of the same stature as the heathen; both kinds had died sometimes as young children, sometimes in middle age, sometimes in old age, sans teeth, sans everything. The cranial capacity in each case was the same; the features and types of skull were similar. Except for the absence of grave furniture, and possibly slight differences in the direction in which the bodies were buried, pagan and Christian burials were practically alike.

The information we are able to obtain as to the mode of living—how they fought, hunted, ploughed, cooked, clothed and decorated themselves; the nature of the boxes, locks and keys, cloth making and sewing materials, musical instruments; the belts, fastenings and footwear of the men; the hair, neck, wrist, and other ornaments of the women, the toys with which the children played; and the animals and plants upon

which they fed—the gold, silver, copper, iron, earthenware, glass, jet, amber and other materials which they used in various ways—for use and ornament, all this



MAP SHOWING SAXON SITES.

information is obtained from the heathens—the Christians have not helped us one bit.

The accompanying map upon which I have indicated all the sites excavated by the late J. R. Mortimer and myself, as well as the positions in which other

finds are recorded, shows that the district was fairly well occupied in Anglo-Saxon times ; and it must be remembered that most of these finds have been made in quite recent years, and that as time goes on, the probability is that even more will be unearthed. Some of the localities shown have been added quite recently.

As to which form of interment (burial or cremation) was in vogue first, it is difficult to say, as similar ornaments, etc., occur with both kinds ; it seems likely, however, that the adoption of Christianity would cause cremation to be abolished as being "contrary to the Scriptures," a belief which is still very rife to-day. Woden, the pagan god, whose name Christians perpetuate in the name Wednesday, enacted a law that the dead should be burned with all their removables, *especially their money*, deeming that they would be more welcome to the gods.*

An important cemetery was examined by Mortimer at Penny-piece field, on Acklam Wold, in 1878, when six interments were examined. Skeletons, with glass and amber beads, had previously been found, and so long ago as 1866, Robert Mortimer secured a very fine circular gold bulla set with garnets, which had been found there. He purchased it for half-a-crown from the Acklam carrier, who had used it to decorate the headgear of his horse. Among the other objects found were a fine iron sword, 39½ ins. in length ; iron knives and sharpening irons (objects which survive in the "steel" in our presentation cases of cutlery) ; a large iron ladle, 8 ins. wide, 4½ ins. deep, and with a handle 14½ ins. long ; iron buckles, etc.

This long sword is of especial interest. Usually

* "Britannia Antiqua," p. 440.

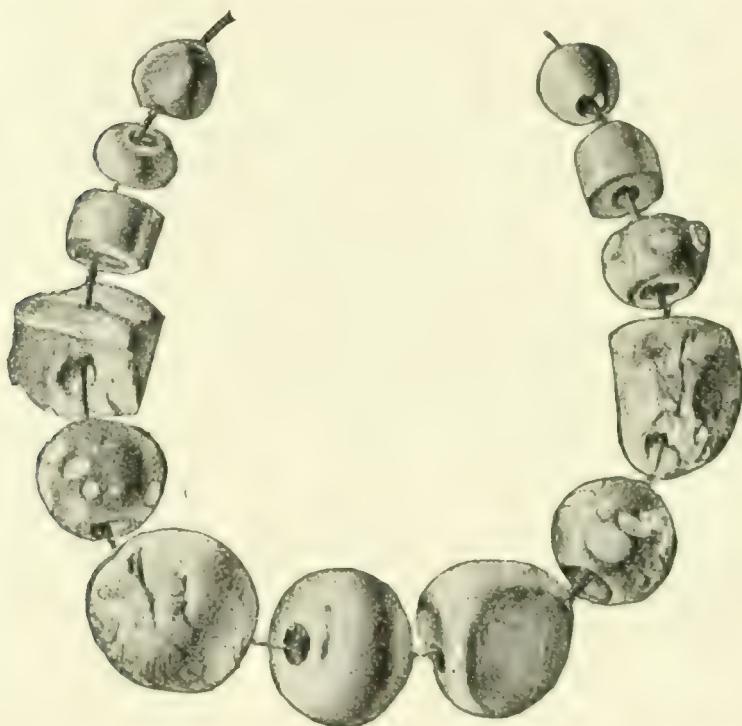
the weapons found with Anglo-Saxons are small or medium in size, single-edged knives—the larger ones being known as "Seaxes" or "Saxes" from which objects the Saxons are said to have obtained their name. Baron de Baye* points out that this large two-edged sword was too heavy to be wielded by a dismounted man and was therefore the special weapon of the horseman. The warriors who carried it were persons of superior rank, and their swords were looked upon as heirlooms, and handed down from one generation to another. They are very rarely met with on the Wolds, but recently I got one, together with two fine spear heads, from an Anglo-Saxon burial at Horncastle.

Another important Saxon site was found by Canon Greenwell in 1868.† The interments occurred in the upper part of a British burial mound, 92 feet in diameter, on Painsthorpe Wold. Of this, Greenwell says, the barrow had, "at a long time subsequent to its original construction, been made use of for burial purposes by a community of Angles (presumably the ancient inhabitants of what is now called Kirby), who had placed in it the bodies of about seventy men, women and children, some of whom, it would appear, had belonged to the poorer classes of the community, while others had certainly been persons of wealth and importance. Quite a small museum of warlike, domestic and personal relics was furnished as the results of a fortnight's digging, and some remarkable features in connection with Anglian interments were ascertained and recorded." One peculiarity was that, contrary to the usual Anglian practice, most of the burials were in contracted attitudes, and not at full length.

* "The Industrial Arts of the Anglo-Saxons."

† "British Barrows," p. 135.

No details of this find are given, but the specimens may be seen in the Museum at York. At Garton-on-the-Wolds, in 1870, Mortimer excavated sixty graves in an Anglian cemetery which occupied the northern fosse of a British double-entrenchment. In this way the



AN ANGLO-SAXON NECKLACE OF AMBER AND GLASS BEADS.
From Driffield.

people were saved the trouble of digging graves, as they merely placed the bodies in the hollow and then covered them with the earth from the entrenchment. Thus it frequently happened that pottery and implements of a much earlier period were found *above* the Anglian burials. The remains obtained included those of men, women and children, and their various objects buried with them.

Besides various miscellaneous articles in bronze and iron, the graves yielded knives and sharpening irons, amber and glass beads, rings, pins, brooches, buckles, iron horse-trappings, and earthenware vases. There were also two gold neck ornaments, and a cylindrical box with lid, of bronze, the size and shape of a large chip pill-box. This box had evidently contained a needle and thread; a similar example, with remains of both needle and thread, was found in another cemetery.



ANGLO-SAXON ANNULAR BROOCH OF BRONZE.
From Driffield.

With one skeleton occurred a few rib-bones of an ox—evidently the remains of a joint of beef which had been placed with the body as food; and at the feet was a small vase—apparently for holding food or water.

The skeletons were placed in a long row—two or three or four deep—the foot of one resting near the head of another.

The cemetery was divided, a space of 46 feet existing between the two lots of skeletons. Those in one section of the cemetery were well provided with relics, while those in the other contained none. It

would, therefore, appear that there were two distinct periods of interment, or, what seems more likely, that the burials related to the period when paganism and Christianity co-existed, the places of interment for each being kept separate. Traces of the habitations of an Anglian community have been found in a field half-a-mile east of this cemetery, a little to the south of the well-known spring at Emswell. " Whenever the ground is tilled, foundations of rude dwellings and quantities of broken Anglo-Saxon pottery are found. In the spring of 1872, Mr. Hopper's shepherd, while attending the sheep, collected a bushel basket full of these fragments."*

A further and similar cemetery was examined in 1866. After the completion of the Sir Tatton Sykes' monument in that year, the workmen were employed in levelling the entrenchment known as Double Dyke, which is close to the north side of the monument, and extends for several miles east and west. In this case forty-two skeletons were recovered in a long narrow cemetery, extending for 63 yards; and others had been excavated in the vicinity in previous years.

Probably this burial place was contemporary with that at Garton Slack, just described, and represented a similar community living in a settlement close by the Roman road from York towards the coast. All the bodies had their heads to the west. Few relics were found.

In 1851, the late Lord Londesborough opened a mound near Driffield, particulars of which he published in the *Proceedings of the Society of Antiquaries* for 1851-2. In this instance a square hole had been cut in the centre of the mound, revealing an ancient

* "Forty Years' Recollections," p. 22.

British interment, with the characteristic British pottery, etc.

In 1870 Mr. Mortimer re-examined this barrow, and found that in Anglian times it had also been used as a burial place, and he obtained twenty-eight skeletons, with which various interesting relics had been placed. In 1887, during the construction of the Driffield and Market Weighton Railway, the mound was levelled, and its site is now covered by rails. Further interments were then excavated, bringing up the total of burials in this one mound to over fifty.

Among the Anglian objects found may be mentioned remains of a number of circular shields, spears, knives, keys, shears and buckles of iron; brooches (square-headed and circular), buckles, pins, bracelets, rings, clasps and tweezers of bronze; several bead necklaces, part of a musical instrument, a well-made bone comb in a bone case, and earthenware vessels.

A large flat mound, 90 feet in diameter, between Driffield and Nafferton, and known as Cheesecake Hill, was opened by Dr. Thurnam of the York Museum, and is described in Akerman's "Remains of Pagan Saxondom" (1855, p. 13). Part of the hill had been removed by the owner in order to fill up some hollows in the field, and "ten to fifteen" skeletons were discovered. Dr. Thurnam examined eight further skeletons, the objects found being removed to the Museum at York. In 1871 Mortimer spent a fortnight in a further exploration of this graveyard, and found 12 more skeletons, eleven of which were of Anglian date—bringing up the total of burials in this mound to "about thirty-five," one of which had been cremated. The graves were particularly rich in relics—very much after the type of those from the Driffield mound just

described - though the brooches and bead necklaces are especially fine.

Many other relics are recorded from the Driffield district. Several Anglian interments were found while making a siding for the Driffield Corn Mill in 1876. In the same year eight or more skeletons, apparently of the same period, were found while excavating at the Driffield gas-works. In 1858, Anglo-Saxon skeletons and relics were obtained while removing part of the Moot Hill in order to fill an adjoining chalk pit. A dozen skeletons were found during the drainage operations on the Scarborough road in 1882. In 1893, while levelling two small fields adjoining the King's Mill Road, Driffield, for the purpose of a recreation ground, several skeletons were discovered, accompanied by small globular earthenware "food vessels."

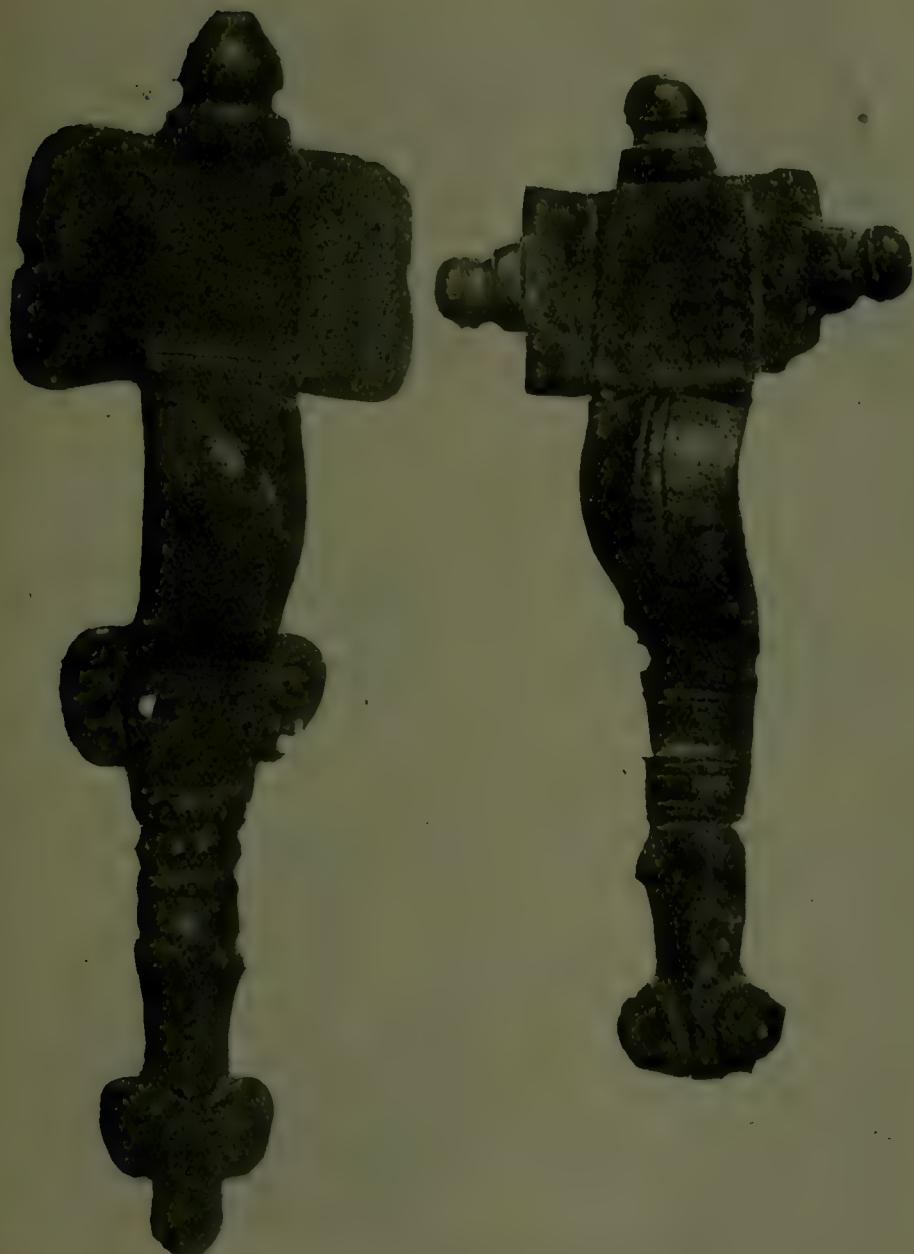
Most of these remains in the Driffield area are of the pre-Christian era.

An Anglian cemetery evidently existed at Londesborough, and Mortimer records* that many skeletons were unearthed between 1870 and 1895, while excavating chalk on Londesborough Wold, north of the village. The East Riding Antiquarian Society made excavations there in 1895, and, as in the previous instances, knives and other objects were found.

More recently, further excavations have taken place in the vicinity, with the result that several important relics have found their way to Hull.* Among them are some unusually fine brooches which were evidently quite new when buried, others show signs of much wear. With one skeleton, buried in a grave cut into the chalk, was quite an important

* "Forty Years' Researches," p. 355.

† *Hull Museum Publications*, No. 33, pp. 10-18.



ANGLO-SAXON SQUARE-HEADED BROOCHES.
From Hornsea.

collection. Around the neck was a string of twenty-eight beads of glass, paste and amber—the larger ones being amber. On the chest was a large square-headed brooch, a pair of similar, but larger fibulæ at the waist, and a large brooch made from the ring at the base of an antler of a red deer. This is especially interesting, as with the iron spike found with it, it represents the most primitive type of ring brooch—the forerunner of the circular bronze brooches found with these burials. There were also, at the side, a pair of bronze girdle-hangers or a "chatelain" which is of value in connection with our inquiry. Baron de Baye* tells us that "Anglo-Saxon ladies wore a very complicated dress, richly and elegantly ornamented. These bronze objects, called by English archæologists, girdle-hangers, have attracted considerable attention. Nothing resembling them has been found in the cemeteries excavated on the Continent, nor has Kent furnished a single specimen. They belong, in fact, exclusively to the districts occupied by the Angles." Bronze clasps and other objects were also found with this burial; adjoining burials yielded spears, knives, sharpeners, and rings of iron.

At the north end of the new hydro at Hornsea, a few years ago, an area about 12 yards by 4 yards, on the top of a slightly elevated glacial mound, was levelled in order to make a Bowling Green. Thirteen skeletons were found in this area, and although one or two objects had disappeared before we arrived, I fancy the remainder found a fit and proper home, as we excavated most of the skeletons.

Among the objects we obtained were a fine buckle, (silvered), two pairs of strap fasteners, etc., of bronze;

* "Industrial Arts of the Anglo-Saxons."



ELABORATELY DECORATED ANGLO-SAXON SQUARE-HEADED BROOCHES.
From Hornsea.

a silver pendant, a dagger-leg, etc., of iron, a perforated bone fibula, a large jet spindle-wheel, the half of an iron brooch, a necklace of 36 beads, and three plain earthenware bowls of the "food-cooked" type.* An interesting bronze bell, evidently of the same date, the first of its kind recorded for the district, was found at the time, though it is said to have been obtained from an adjoining garden.

Some of these objects had features of great archaeological importance, which have been described in detail elsewhere, and the series of brooches enabled me to trace the evolution of a curious horse-head decoration which occurs on certain types of fibulae of this period, and this evolution in artistic progress enables us to give relative dates to specimens of this character.

About twenty years ago, when visiting a sand-pit near Newbald, I noticed fragments of human bone scattered about the pit floor. They had evidently fallen from the upper part of the section, and a little excavation showed that there were numerous skeletons buried in shallow graves in the sand. These were carelessly amateurishly examined, supposed to make too great trouble on the farmer's crop. With these burials were found the usual types of small daggers, knife-hilted, bone-headed, brooches, etc.**

In this case the local need for building sand enabled us to trace the resting place of the founders of Newbald where there is still a church, built by the Normans (in fine preservation).

Within quite a short distance of Newbald is Sandon, which gives the yielded-up a extraordinary series of Anglo-Saxon remains, quite different from anything else

* See Hull Museum Publications Nos. 1 and 2.

** See Hull Museum Publications Nos. 1, 2 and 3.

in this area. Here a larger cemetery was discovered—but in every instance the bodies had been cremated, and the bones, etc., carefully collected and placed in cinerary urns, which were buried in rows like so many enormous turnips. The remains were first described by the late Dr^r Roberts,* as follows:—

"The drawings which I lay before the meeting represent a number of urns from a Saxon cemetery at Sancton, co. York, a village south of Market Weighton, and the once much better known Goodmanham. These urns mark, as I believe, and as far as is known, the northern limit of cremation as practised to any considerable extent by Teutons in the north of England. But, little as we know of the history of the conquest of Northumbria, we have some reason for believing that Æthilfrith was an unbeliever, and that by his great victory of Daegsastan in 603, a pagan Saxondum was established under his rule from the Humber to the Forth. If Æthilfrith was a heathen, such, no doubt, were his followers; and if the whole of Northumbria was heathen in 603, its two component sub-kingdoms of Bernicia and Deira were, it cannot be doubted, at least as pagan for the period little short of a couple of generations which intervened between the date of the battle of Daegsastan and that of the landing, before A.D. 547, of Ida the Flame-bearer at Flamborough Head. The bones, however, of the unsung heroes of these wars have not previously been found in cremation urns, at least in any abundance, though contracted Teutonic burials are common enough between the two latitudes mentioned."

Subsequently, the late J. G. Hall wrote a paper,†

* *Archæologia*, Vol. XLV., pt. 2, pp. 404-410.

† *Trans. East Riding Antiq. Soc.*, Vol. V., 1907.

describing further discoveries, most of which, together with a large collection formed by Dr. J. W. Wilson,* are now in our Museum. These collections, consisting of about two dozen vases, with their contents, have since been figured and described in detail by the present writer.

The urns are usually globular in shape—with rounded bases, and hand made being much inferior in workmanship to the earlier Roman pottery, which was turned on a wheel, and well baked in proper kilns. They average ten inches in height and are decorated by various impressions from wood and bone punches, representing circles, crosses, squares, etc. Occasionally a signet ring or other object was used. Another favourite method of decoration was by forming circular or oval bosses—pressed in the soft clay from the inside of the vase. Each urn contained the cremated remains of one person, and occasionally a small vase held the burnt bones of a child. These had evidently been carefully collected from the funeral pyre and placed in the urns, sometimes while still hot. That the people whose remains they contained were contemporary with the Anglians whose skeletons are found at Newbald and other places, is shown by the similar series of brooches, etc., found with the burnt bones. At times the beads or bronze ornaments are fused into a shapeless mass by the heat of the fire, though in other cases they are hardly damaged. From the urns in our collection we have modelling tools and combs of bone; tweezers, remains of bronze clasps, rings, a pin and fibulae of bronze; knives and shears, a ring and pin of iron, earthenware spindle whorls, glass beads, a crystal

* *Trans. East Riding Ant. Soc.*, Vol. XVI., and *Hull Museum Publications*, Nos. 66 and 67, 1909.

bead ; and one small vase, containing the remains of a very young child, included a ring upon which was threaded a knife, shears and tweezers—all of bronze—evidently toys or part of a doll's equipment.

This Sancton cemetery has yielded far more pottery than the whole of the scores of Saxon burials examined by Mortimer and myself in East Yorkshire, and the examples we found were smaller and evidently ordinary domestic or culinary vessels.

We have a single Anglian vase from Swine, and another example is from near Market Weighton.

Recently I saw in a collection at Roos a fine bronze pendant of this period, but differing from anything of the kind found in this district.*

Other Anglian relics from East Yorkshire include a small brooch and bead found with a skeleton at Melton ; a coffin made of slabs of chalk found at Hessle, remains of brooches from Beverley ; and a ring-brooch and bead found near Bridlington.†



GOLD ANGLO-SAXON JEWELLED RING FROM DRIFFIELD.

A jewel of great rarity, relating to this period, was recently obtained from a dealer in Piccadilly, London. It had been found at Driffield, E. Yorks. It is of fine gold, elaborately decorated, and has a

* *Trans. East Riding Antiq. Soc.*, Vol. XX., 1914, p. 52.

† See *Hull Museum Publications*, No. 117.

large oval garnet. Only two others of this type have hitherto been found in Britain, though several similar are recorded from Scandinavia.

The Anglo-Saxons had a coinage; small pieces known as stycas, the obverses and reverses of which were entirely occupied by the names of the monarch and moneyer respectively, one being quite as prominent as the other. These were struck at York and various other places. We have a few examples of these coins from Barmston, South Ferriby, York, etc.

The recital of relics just given demonstrates that this district was quite well populated in the sixth century and afterwards by people who were well clothed and well armed; people who certainly possessed considerable artistic taste. Some of them were pagan, though as Saxon work in our churches proves (none better than the church at Barton-on-Humber), some had adopted Christianity. Notwithstanding all this, evidences of their occupation and cultivation of this area would have been entirely wanting were it not for the accidental discovery of their graves in different parts. In no case was a mound or monument erected to mark the burial place of the departed, and in not a single instance can one bring forward any evidence of the names of those buried nor of their lords or rulers. That they settled here is certain. They divided the areas into townships, cleared the woods, made roads, built houses, tilled the fields, and built churches or temples for their God or gods. They existed side by side with the Danes and Norsemen—possibly intermingled with them—and from this mixture with some of the original British stock which remained in the more hilly parts great numbers of our present enormous population have descended.

THE DANES IN EAST YORKSHIRE

UNDER the general term "Danes" are included the northmen ("vik-ings"), who plundered our shores in the eighth and ninth centuries. According to the Saxon Chronicles, in the year 787 the first Danish ships arrived, containing men who sought the land of the Angle-folk. Originally plunder was the principal purpose of these incursions of the northmen, who, as time went on, like the Angles, sought their homes in this country, and many of them settled here. Mr. Benson has described an interesting discovery of Viking relics at York (Annual Report of the Yorkshire Philosophical Society for 1905, published 1906). This includes several objects which have not previously been reported in England, and some fine examples of the characteristic zoömorphic interlacing designs of the period. The specimens are attributed to the first half of the tenth century, a period which saw the Scandinavian power in York rise to its zenith. In East Yorkshire particularly is the influence of this Danish invasion felt, and perhaps even more strongly than in the case of the Anglo-Saxon place-names do we get evidence of their early settlements. The City of Hull itself was originally known by the name of Wyke, and is so referred to in the Chronicle of Meaux, and in other documents. Wyke is merely another form of the word "vik" or creek, and was so called by the original Danish settlers, because the hamlet

was built on the sides of the vik or creek, just as to-day the town gets its name of Hull from the river upon which it is built.

The Danish villages, which are so frequent in East Yorkshire and North Lincolnshire, can be at once identified by the suffix "by," "thorpe," and "thwaite." The site of a Danish village was usually chosen midway between two of the older Anglian settlements; it was placed upon the side of an existing road, and it was sometimes carved from the Anglian lands on either side. This is strikingly shown when we come to examine the positions of the Danish villages in the district. As the late J. R. Boyle pointed out, "Such wayside settlements are Carnaby and Bessingby, on the road from Bridlington to Driffield; Lund and Tibthorpe, on the road from Wetwang to Beverley; and Willerby, on the road from Hessle to Beverley. When, as was sometimes the case, the new settlement was planned at a little distance from the existing road, a new road running off at right angles from the old one, and leading directly to the settlement, was formed. Skidby, Towthorpe, Kirby Grindalythe, and many other villages, are instances in point." The same writer also very ingeniously demonstrates, by taking the areas of Danish and Anglian settlements respectively, that the greater part of the country was already taken up by the English, and that consequently only small areas were available for the newer Danish villages.

In Danish times Holderness would be somewhat isolated, having regard to the fact that most of it was covered by mere and marsh. Danish settlements in this low-lying area are therefore conspicuous by

their absence. The only place in which a group of "by's" occurs is in the parish of Swine, where there are Ellerby, Thirtleby, and Coningsby, the



IMAGES OF BOAT AND CREW MADE BY NORTHMEN WHO RAIDED HOLDERNESS MORE THAN A THOUSAND YEARS AGO.

Found near Roos.

last meaning "king's town," and indicating royal possession.

Nothing is more striking when examining a map than this difference between the arrangement of the Anglian and the Danish villages, and likewise the

difference in their respective areas; the contrast being sufficient to warrant the conclusions already drawn.

Of Scandinavian origin, but of much earlier date than the period just described, is the model boat and warrior crew, the latter armed with clubs and shields, found in Holderness in 1836. It is one of the principal treasures in the Hull Museum, and probably represents the oldest Scandinavian relic found in the country.

EAST RIDING CHURCHES .

By CANON A. N. COOPER, M.A.

ALDBOROUGH, about twelve miles from Hull, and a mile from the sea, has a church with tower and nave arcades, which are Transitional. The rest is Perpendicular. The church is said to owe its origin to the Culdees, an Irish Christian brotherhood. The most noticeable feature in the church is a sundial, bearing an inscription which, translated, reads:—“Ulf bade rear a church for the poor, and for the soul of Gunware.” This Ulf may be the same as bequeathed his wealth to York Minster to avoid the contentions of his heirs.

ATWICK is three miles north of Hornsea, on the coast. The church is modern, but contains a fourteenth century font, which was once sculptured, but the decorations have been chiselled off. At the junction of five roads is an old stone cross, on which was once an inscription, now quite illegible, but possibly it recorded the distance it stood from the sea.

HEDON was a town of considerable importance formerly, as is shown by its possession of three churches, and its having a Mayor and Corporation to this day.

This must be borne in mind to account for its large church, the “King of Holderness,” capable of seating as many people as Hedon contains. The site of the church, occupying part of the highest ground in the whole township, and forming the very centre of the oldest parts of the settlement, could only have been appropriated to it at the founding of the town. A

competent authority places it on a line with the finest churches in East Yorkshire, with Holy Trinity, Hull, with St. Mary's, Beverley, and with Patrington, and says that, "even in its mutilated state it combines more dignity and beauty than is found in any one of these separately." This is high praise, but finds its justification in the fine tower, the decorated nave, and the tracery of its windows, which are said to be unsurpassed in beauty of proportion, in purity of design and excellence of details by any three light windows in the kingdom."

"The mutilated state" of Hedon Church refers to its having been deprived of its aisles or chapels, but doubtless economy had to be practised when Hedon fell from an importance equal to Hull to the single-street town of the present day, and the rich merchants were no longer there to lavish their wealth upon their church.

The font is remarkably fine, and on its sixteen faces may be noted the sacred monogram, the Tudor rose, and the grinning leopard's head of the De la Pole family.

The tower is known to have been erected in the earlier half of the fifteenth century, as shown by a will dated 1428, bequeathing a donation towards it. It has two great stages, each of which has two windows on each face. Above is a beautiful open-work parapet, with sixteen crocketed pinnacles.

The chancel is exquisite Early English style, with a clerestory resembling that of the transepts, but the east window is a perpendicular insertion, which was common in the fifteenth century in Yorkshire, of which examples may be seen in York and Beverley Minsters.

SELBY. It is said that the remote cathedral of St. Davids was spared at the Dissolution because the grandfather of Henry VIII. was buried there, and it may be that Selby Abbey was more tenderly dealt with than its neighbours, because the King's remote ancestor, Henry I., was born there. It is fair to add that better reasons may be adduced, for no charges of lax behaviour were ever brought against either its abbot or its monks, who retired on substantial pensions.

Selby Abbey bears the rare dedication to Saint Germain, a French saint. A pious monk came armed with a finger of the saint and laid the foundation of what was to become one of the wealthiest abbeys in England. This was before the Conquest ; but William I. was very partial to the place where his youngest son was born, and made many royal grants to it. Perhaps it was half a century after the Conqueror that the Norman portion of Selby Abbey was reared. This included the pillars bearing the central tower, together with the abbot's house, the cloisters and other buildings which now no longer exist. Selby Abbey is the only one of the Yorkshire abbey churches which is not wholly or partly in ruins, and is the most perfect monastic church in the county.

There are few buildings which afford better opportunities of studying the various styles and changes in English ecclesiastical architecture. With one exception—the Anglo-Saxon—every style of Gothic church architecture is found here.

The Norman style includes a period from 1066 to 1150. Its main characteristics are semi-circular arches, the mouldings of which are sometimes plain, but often profusely decorated with zig-zag ornament. Examples

of this in Selby Abbey are the lower part of the north transept, the tower arches, and the first two bays in the nave.

The Transition, or Semi-Norman style, dates from 1160 to 1190. This change was gradual, and we find examples of the rounded and pointed arches side by side. Examples of this style at Selby include the whole of the nave (with the exception of the first two bays) and the clerestory.

The Early English style prevailed from 1190 to 1272. The arches of this period are more or less pointed, the pillars are formed of slender shafts clustered together, and the characteristic ornament is the dog-tooth. The examples at Selby are the nave clerestory and the upper portion of west front.

The Decorated style is from 1272 to 1327, at which point English architecture is considered to be at its best. It takes its name from the profusion of exquisite decoration: the windows are generally large and divided into two or more lights, the upper portions filled with geometric and flowing tracery. The whole of the choir at Selby is in this style.

The Perpendicular period prevailed from 1377 to 1547, and its chief characteristics can hardly be mistaken. In the larger windows the flowing tracery has given place to panel-like compartments, and are often divided into two or more stages by cross lines of masonry called transomes.

Bearing the above facts in mind, even the casual visitor will be able to gather something of the history of the Abbey. Particular attention should be paid to the triforium, of which no two bays are exactly alike. There are few more interesting examples of Transitional work than this.

The Abbey has been completely restored after the disastrous fire of twenty years ago.

| HOWDEN. The will of Bishop Skirlaw, by whose bequest the tower of Howden Church was completed,



Photo by |

| C. W. Mason

HOWDEN CHURCH—RUINS OF THE CHAPTER HOUSE.

is dated 1406, so we shall see at once we have to deal with a comparatively modern building. Byron remarks that "beauty is best set off afar," and it is so in this case, for the tower of this noble collegiate church dominates the whole town when seen from a distance, but near by is encroached on three sides by mean, little, red brick houses.

We have to deal with a building which has a body of the Decorated period with Early English work in the transepts, a Perpendicular tower, and a Perpendicular chapter house, which, unfortunately, is in ruins, but evidently was the gem of the whole. The plan of the church is cruciform, but the chancel, like the chapter house, has long been in ruins. How it came about that a Bishop of Durham had a residence in the south of Yorkshire we need not stop to enquire, but it was owing to the munificence of the Bishop, Walter Skirlaw, of Durham, that the stately pile was reared. At the Dissolution its revenues passed into private hands, and the fabric, stripped of the endowments necessary to maintain it, soon showed symptoms of decay. By the middle of the seventeenth century the chancel had become so unsafe that it was closed, and service, henceforward, was conducted in the nave.

The nave is 105 feet long and 66 feet broad; the transepts are 117 feet in length and 30 feet in breadth; the choir is 120 feet in length and 66 feet in breadth; the tower is 135 feet high, and the total length of the church is 255 feet. The west front is of remarkable beauty, and is divided into four parts by buttresses which rest on crocketed finials. Over the large west window of four lights is a crocketed pediment rising to the roof. The west window, like those of the aisles, contains some very fine tracery. The parapet of the nave contains some curious grotesque carvings.

Within that portion of the church still used for divine service there are several monuments of much interest. In the chapel in the south transept are the effigies of a crusader and his lady, and his shield bears the arms of the family of Metham. Another crusader close by bears the arms of the Saltmarshe family.

There is a fine rood screen of the fourteenth century. The ruined east front is much richer than the west, but scarcely more beautiful.

The Decorated nave consists of six bays, and is covered by a modern waggon roof, but above the tower arch may be noticed the weather moulding of



Photo by

[C. W. Mason.

HOWDEN CHURCH FROM THE SOUTH.

Showing how the east end of the church has been destroyed.

an earlier roof. Above the door of the south porch is a PARVISE chamber, from the window of which a watch could be kept on what went on in church. Nailed against the north wall are three fragments of brasses, the uppermost of these is part of a canopy, the middle is the figure of a knight in plate armour, which might be dated about 1480; the lower is an inscription to Peter Dolman, who died in 1621.

Gent, writing in 1731, says "the choir of Howden Church fell down a short time since. It is small consolation to know it was not deliberately destroyed like the choir and transepts of Bridlington Priory."

PATRINGTON CHURCH is the "Queen of Holderness." The wonder arises how so small a place can possess so fine a church. Two answers may be given. One is



Photo by

C. W. M.

A PISCINA IN PATRINGTON CHURCH.

that the East Riding, and specially places on the coast, was far richer in merchants in the days when our chief export was wool, which was sent to Flanders. Another answer is to be found in the munificence of Archbishops of York, who were Lords of the Manor of Patrington from before the Conquest to the time of Henry VIII.

Patrington Church possesses this rare artistic quality—unity of effect—in very large measure. Competent authorities assign the building of the church

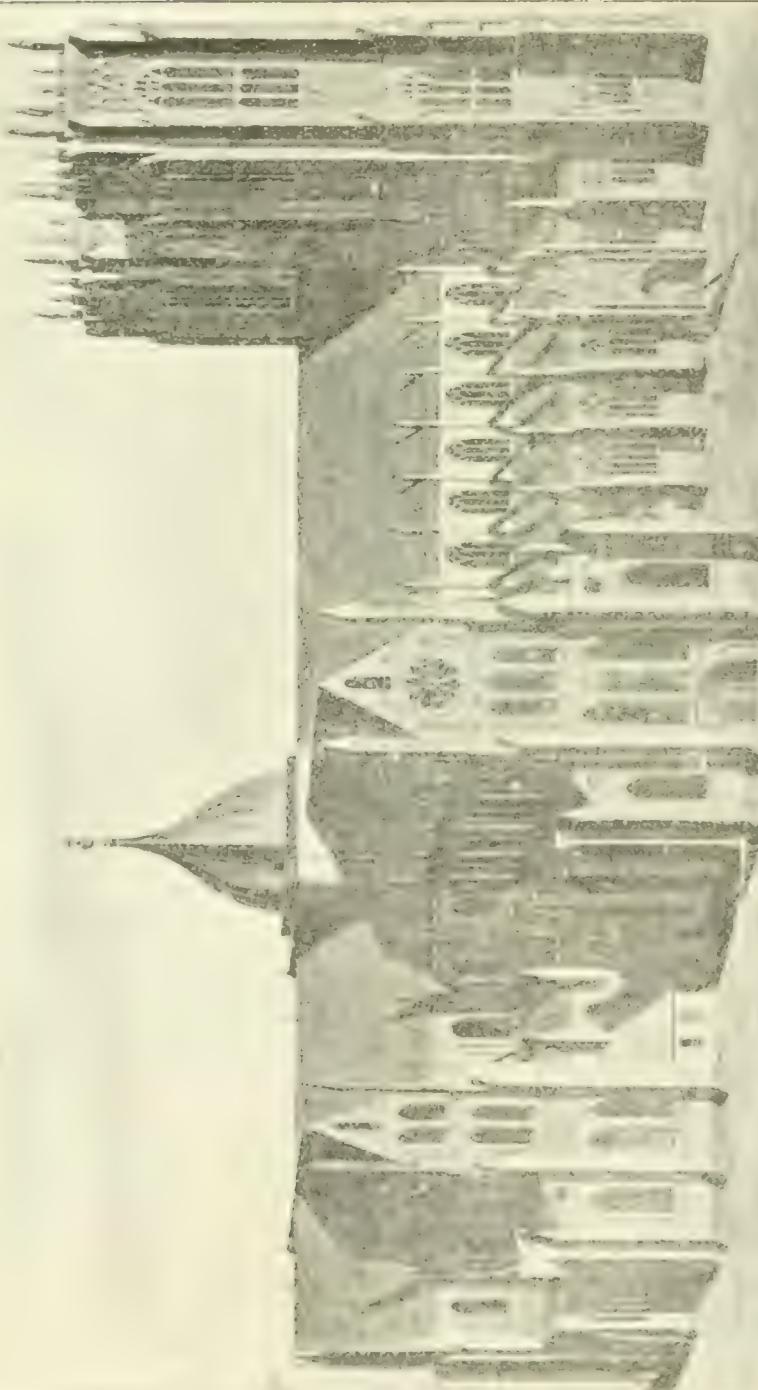
to the days of the great Archbishops, Walter de Gray and Thoresby, who ruled the diocese from 1216 to 1352, and nothing seems to have been added to the fabric since the middle of the fourteenth century. The complete effect would suggest the design of one mind; and the late Canon Raine has put forward the theory that Robert de Patrington, who was the Master Mason of York Minster, was also the responsible builder of this church, and gained his post at York by reason of his achievements in his own town. The architecture is principally of the Decorated Gothic style, combined with some fine perpendicular work, and the fabric consists of nave, north and south aisles, transepts, chancel and a tower surmounted by an octagonal spire 180 feet high. The exterior of this grand church is enhanced in interest by its strange and grotesque gargoyles, its crocketed buttresses and the transition from tower to spire by interposing an octagon between the two.

The pride of the chancel is the famous Easter sepulchre in marvellous preservation. At the foot are three sleeping soldiers in chain armour, each beneath a crocketed ogee arch. This is the only structure of the kind now remaining in Yorkshire.

The south porch is surmounted by a vaulted PARVISE, which looks into the church by a small two-light window.

The church is dedicated to St. Patrick, from which the place also derives its name, possibly from some hermit who came from Iona where he had been trained by St. Patrick's missionaries.

BEVERLEY MINSTER has its roots deep down in English history, and if we could believe a chronicler, we might speak of its founder as Lucius, King of



BINGLEY MINSTREL IN THE EIGHTEENTH CENTURY, FROM THE NORTH EAST.

Britain, A.D. 126. Confining ourselves to sober history, we may say that a church existed before the Conquest, to which Archbishop Kinsius (1051-1060) added a tower. His immediate successor, Ealdred, enlarged it by a presbytery, and decorated the ceiling with great magnificence. From this date till 1188 there exists absolutely no record of the history of the



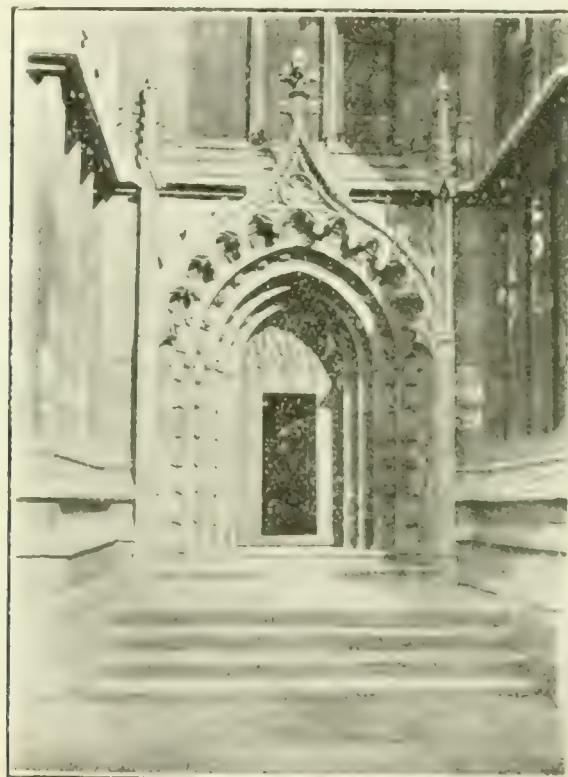
Photo by]

C. W. Mason.

'EARLY ENGLISH' DOORWAY IN THE SOUTH TRANSEPT
OF BEVERLEY MINSTER.

building, but there is a strong presumption that the Saxon Church was replaced by a Norman one of the twelfth century. Canon Nolloth, the late vicar, was of opinion that the original Norman nave is still *in situ*. This view, though not generally received, is very probable. In 1188 the church was burnt down, or at least greatly damaged, by fire. It was patched up, but an ultimate rebuilding was necessitated by a more crushing calamity. The new central tower had been

built on the old piers, and the fate of patching an old garment with new material was repeated, for it fell to the ground, involving the ruin of the chancel and the eastern end of the nave. This final catastrophe



Photograv.

C. W. M.

SMALL 'DECORATED' DOORWAY AT THE
WEST-END OF BEVERLEY MINSTER.

necessitated the rebuilding of the church in the form in which we now see it, and may be dated in the second quarter of the thirteenth century, *i.e.*, tempore, Ed. I.

The front of the Minster is on a simple and logical plan of a centre tower between two similar towers placed at the ends of the aisles, and is the purest and most perfect specimen of a Perpendicular west front

in this country. What the west front of York Minster is to the Decorated style this is to the Perpendicular.

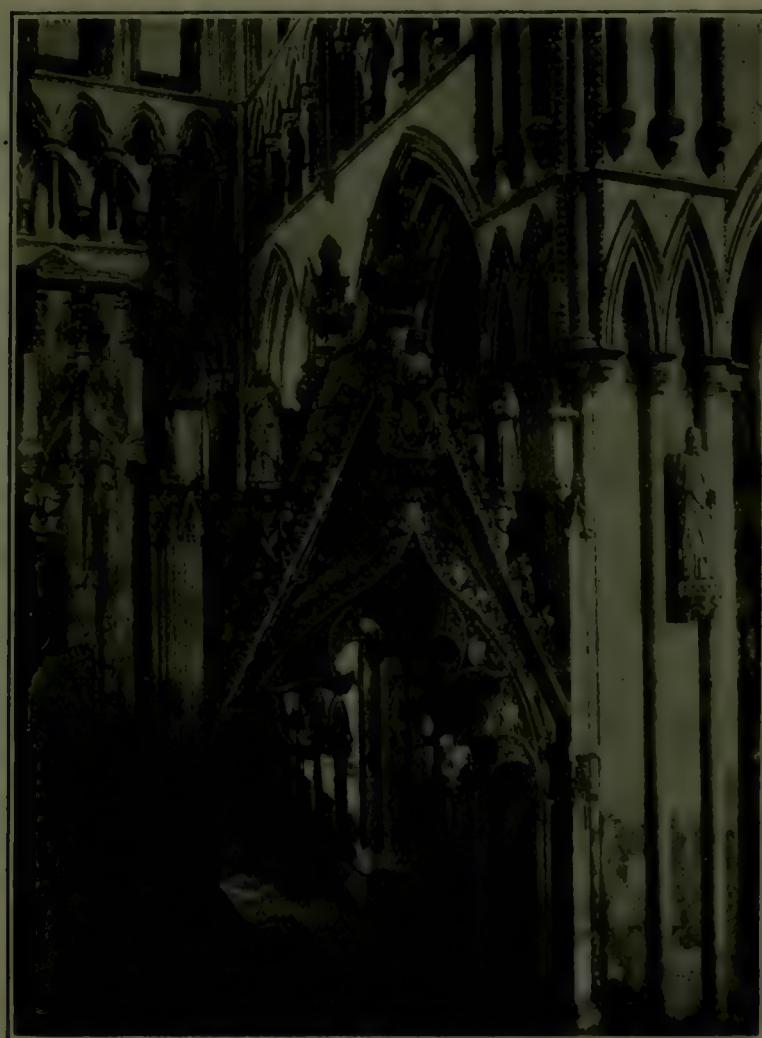


Photo by]

[C. D. Holmes.

THE PERCY TOMB, BEVERLEY MINISTER.

Each tower has four large and eight small pinnacles, and a very beautiful battlement. The whole front is panelled, and the buttresses, which have a very bold projection, are ornamented with various tiers of

niche work. The doors are uncommonly rich, and the canopy of the great central door runs up above the sill of the great west window. The towers are 200 feet high, the same as at York and Lincoln.

The Minster is constructed throughout of Newbald and Tadcaster stone, both from the neighbourhood, and are suited to the Beverley climate.

Every visitor to the Minster must see the Percy Shrine, which is on the north of the sacrairum, and consists of a plain altar tomb surmounted by a rich canopy. The canopy, according to an article in the "Encyclopædia Britannica," stands unrivalled by any Continental example. The tomb is probably that of Eleanor Fitzalan, wife of the first Lord Percy, who died in 1328. The shields on the tomb bear the arms of Warren, Fitzalan, Bruce and other of our oldest families.

The choir stalls are sixty-eight in number, and all are furnished with misereres. They are carved with all kinds of grotesque figures, much of the fun in the carvings seems to have been the chaffing of the "secular" by the "regular" clergy. Under the seats may be found a monkey riding upon a hare, a monkey shriving a dying goat, hogs dancing to the hornpipe played by a hog, and a shrew being wheeled off to the ducking stool, while she is tearing her husband's hair.

The altar screen was erected in the Decorated period, and has a staircase at the north end.

The famous Frid-stool stands near the entrance to the Percy Chapel, and gave sanctuary to criminals of all kinds. It formerly bore the following inscription :—"A FIDE SEDIS LAPIDEA FRIDSTOOL DICITUR IN PACIS ECCLESIA. AD QUAM RIAS LUCENDO PERVENIENS, OMNIMODUM HABET SECURITATEM."

From the earliest times, all duly registered fugitives were at liberty to remain for life within the Beverley limits on swearing obedience to the Minster and the town officials. The register of fugitives between 1478 and 1539 is extant in the British Museum. The number of those who took the oath as sanctuary men in those sixty-one years was 495, an average of eighty



Photo by

[C. W. Mason.

THE 'BEVERLEY IMP'—ST. MARY'S CHURCH, BEVERLEY.

a year. Of these, 208 came and sought sanctuary to avoid their debts, 186 on account of homicide or manslaughter, and the remaining hundred for various kinds of felony. The fugitives varied in position from gentlemen down to labourers, and included every kind of trade. These fugitives were allowed to ply their trades, but were not permitted to carry any arms.

BEVERLEY ST. MARY'S is a cruciform edifice, consisting of a nave with north and south aisles, a

transept, a chancel with aisles, a massive tower at the intersection, and a south porch. The length of the nave is 100 feet, and its breadth 61 feet, the length of the chancel is 76 feet, and its breadth 25 feet. The height of the tower is 99 feet.

The architectural features of the exterior are remarkable for the variety of different styles. The west front is of the Transitional period between Decorated and Perpendicular. Its window of seven lights is pure Perpendicular, but the octagonal buttresses are of late Decorated period. The south porch shows a corresponding variety. The inner arch is Norman, the outer Early English, the porch itself is Perpendicular, as is the nave, and so are the transepts. The chancel approximates to the nave in character, and the tower is Perpendicular.

The interior of the church is not less graceful and dignified than the exterior. The nave is divided from its side aisles by an arcade of six arches resting on columns formed of four cylindrical pillars with octagonal capitals. The pillars in the nave are all worthy of careful examination because of the inscriptions on their corbels, wherein is set forth the names of those who shared in the pious work of restoring the church in the sixteenth century. This was necessitated by the fall of the tower during service in April, 1520, which crashed into the church, and killed many, as an inscription on one of the pews in the nave recalls: "Pray God have mace of al the sawllys of the men and wymen and cheldrym, whose bodys was slain at the faulyng of this chere."

Of these pillars and inscriptions, the most interesting is the sixth, known as the Minstrels' Pillar, and is inscribed: "Thys pyllar made the meynstrels."

Round the capital are figures of minstrels playing instruments which may be identified as a harp, a drum, a violin, a lute with five strings, and a pipe.

There are several other important features of the nave. The great west window was designed by the elder Pugin, the west windows of the north and south aisles by the younger.

The earliest part of the architecture is undoubtedly found in the chancel and transept. The former has five bays on each side, the arches and spandrels of those on the north being much more elaborate than those on the south. Over the choir is a flat ceiling, divided into forty panels, on which are depicted the sovereigns of England, from Brutus (one of Geoffrey of Monmouth's imaginary creations) to Edward IV. The stalls of the choir have misericords of a similar character to those in the Minster.

A curious piece of history not generally known is enshrined in a tablet attached to the south wall. This refers to the landing, in 1680, of 7000 Danish soldiers for service under William of Orange, whose throne was none too secure. Two of these soldiers fell to quarrelling, perhaps no wonder, considering, as De la Pryme tells us, "they loved strong drink." The quarrel ended fatally, and perhaps we should have known nothing about the Danes and their landing but for the inscription on St. Mary's wall :

"Here two young Danish soldiers lie,
The one in quarrel chanced to die;
The other's head, by their own law
With sword was severed at one blow."

BRIDLINGTON PRIORY was founded by Walter de Gant, a nephew of the Conqueror, and is believed to have been completed in the early half of the twelfth

century. As everything but the present church and the bayle gate was destroyed in 1539, when the last of the priors was hanged for taking part in the Pilgrimage of Grace, we may confine our remarks to what exists at present.

The church had been terribly neglected until taken in hand by Sir Gilbert Scott in 1846, and for thirty years was in process of elaborate restoration, with the happy result that it is now one of the most notable ecclesiastical edifices in the county. It consists of a nave with north and south aisles, a chancel, north porch, and towers at the west end, the front of which is not unworthy to be compared to those of the Minsters of York and Beverley. The interior is very fine and striking, the nave being separated from the aisles by nine arches springing from clustered pillars of twelve shafts resting on a quadrangular base. At the west end is a fine Perpendicular window of eight lights, divided by a transome, and filled with modern stained glass of much beauty, the east window is in the Decorated Gothic style, and has seven lights. One of the finest architectural features of the church is the north porch, which is remarkable for the beauty of its mouldings and ornamentation, and appears to be of the fourteenth century. There are several objects of interest within the church, e.g., the jongs, a collar attached by a chain to a pillar, in which small offenders, such as scolds, brawlers and the like, were made to stand for longer or shorter periods. There is a stone offertory box also attached to a pillar, and several chained books dating from the seventeenth century.

The bayle gate is the last of the four gates built under the licence of Richard II., when the prior and canons requested leave to fortify their house. It is

an excellent specimen of pointed architecture, and is noticeable for its mouldings and ornaments, which exhibit several quaint devices. There is considerable room within it, and one apartment was used for holding



THE PRIORY CHURCH, BRIDLINGTON.

the weekly court ; another was a prison for offenders, and another served as the porter's lodge. The building has recently been used as a museum illustrating local history.

WATTON ABBEY was one of those few religious houses which contained both monks and nuns. What

remains of the abbey is used as a farm house, and what remains of the nunnery is used for the stables. The place was founded by Gilbert, of Lempringham, about the middle of the twelfth century, and excavations by Sir St. John Hope laid bare the ground plan of the former buildings. Circumstances did not allow of their remaining uncovered, so it may be said that two churches were laid bare, one for the nuns, and the other for the monks, the former being the larger, and the prioress took precedence of the prior.

The present Watton Church is built of brick, and most of the windows are Perpendicular. It dates from the Tudor period, but two Early English windows have been built into the structure. There is a Perpendicular screen which extends as high as the ceiling, but there is no chancel arch. Formerly the chancel was depressed, as at Filey, Bainton and elsewhere. Collected in the church and vestry are a number of old fragments, which have been brought from the former priory.

PLACE NAMES OF THE EAST RIDING OF YORKSHIRE

By JOHN NICHOLSON

PLACE names are “footprints on the sands of time,” yet it is often difficult to determine whose are the footprints. Some names are finger prints on the plastic past that betray their owners, shewing, like an old play-bill, the names of actors long since dead and forgotten.

Upon the ancient inhabitants of this district, the Angles, commonly spoken of as the Saxons, bore down “like a wolf on the fold.” They swarmed up the rivers, the natural inlets, and with fire and sword, they waged a merciless warfare of extermination on the natives. This fully accomplished, the conquerors settled down in the territory they had conquered, and soon their “tons” (enclosures), “hams” (homes), and “wicks” (villages) were dotted all over the country. All original names of natural features vanished, and new names arose. The streams became “becks” (Lowthorpe Beck), a rivulet, a “gote” (Stoney Gote), and the intermittent streams from the Wolds bear the name of “gypsey” (hard “g”). Valleys are “dales” (Danesdale), the head of the dale is the “bottom,” (Blackmeredale Bottom), a shallow valley is termed a “slack” (Garton Slack), a promontory a “nab,” whether inland (Fimber Nab) or on the coast (Cat Nab). A hill is known as a “howe” (Willy Howe) or a “barf” (Brandesburton Barf), a lake

as a "marr" (White Marr), and a field as an "ing" (Sutton Ings).

Yet it is possible that some of the original river names, difficult and problematic though they may be, have been preserved, like the fly in amber, in place names, as in *Catfoss*, *Cawkill*, *Emswell*, *Dunswell*, *Scithelholme*, *Fangfoss*, *Naburn*, *Skeckling*, *Skirpenbeck*, *Stillingfleet*, and *Scurthdike*.

The Romans held sway in Britain for hundreds of years. They had a port on the Humber, probably Brough, from which station their galleys plied to Rome, for "the sea but unites the countries it divides." Splendid roads they made, which are splendid still, and their impress can be noted in Wharram-le-Street, Garrowby Street, The Street near Flotmanby, and Humber Street near South Cave, which place itself bears a Roman name, Cave, unaltered from the time of the Domesday Survey.

The Anglian suffix "ton" (every village to-day is called by its inhabitants "oor toon") is by far the commonest of all place name endings in the East Riding, yet some of the names bear unmistakable Danish identification discs, as, *Grimston*, *Barmston*, etc. "Ham," another Saxon suffix, is common. Some places have lost it, as *Wetwang* (anciently *Wetwangham*), and some hide it, as *Ulrome* (in Dom. Bk., *Ulreham*).

The terminal "ley," a pasture, has not many representatives, but it is a suffix which has caused some mistakes. The last letter "y" is the mark of a lost guttural sound (hard "g" or hard "c"), and the terminal thus spelt in *Beverlac* (Beverley) and in *Fivelac* (Filey), and interpreted as meaning "lake," has given rise to false derivations. The peculiar

looking word "Skirlaugh" retains the hard "gh" in the spelling, but ignores it in the pronunciation "Skella." The word in Domesday Book is *Scirlai*, i.e., Scire-ley or Shirley.

In later years, the fierce Northmen or Danes followed the lead of the Angles, sailed up the same rivers, hacked and destroyed in like manner, but when the wild burst of the storm was over, the land, people and government re-appeared unchanged. The Danes did not exterminate, they amalgamated. This is shewn by some places having two names in the two different languages at the same time, as Ella (Ang. Elveley, Norse Alvengi), Driffield (Ang. Drifelt, Nor. Drigelinghe), Kelleythorpe (? Ang. Greets, Nor. Calgestorp), Wansford (Ang. Wandesford, Nor. formerly and locally, Wandeswath).

Where the Danes ruled and settled, they divided the country into trithings (thirds) and wapentakes, and Yorkshire is divided in this way to-day. The East Riding has six wapentakes, including Holderness, which had and has the tripartite division—North, Middle and South. The word *Holderness* in one of the Sagas is *Hallorness*, which looks as though the "ness" derived its name from the River Hull that forms its western boundary. In 1231 a grant was made of land situated in the *Middle-trithing*, which word gives us the original and correct form, corrupted into *Riding*.

The wapentake takes its name from the ceremony of "tigging" or touching weapons, as a token of fealty. Boys imitate this ceremony in their game of "tig," and shew, in pantomime, the outlawry and the pursuit of a delinquent, in a variety of the game called "lame tig."

• Harthill, the largest of the East Riding wapentakes,

is sub-divided into five parts, bearing names reminiscent of the days of Elizabeth and of Napoleon—Wilton Beacon, Holme Beacon, Bainton Beacon, North Hunsley Beacon and South Hunsley Beacon.

The Dane may be traced by places terminating in "by," a farm (Willerby); "holme," island or river meadow (Balkholme); "thorpe," pronounced "thrup," a village (Foggarthorpe); "toft," a field (Langtoft); "with," a wood (Bubwith); "wick," a bay or creek, pronounced "ick" (Thornwick); "wath," a ford (Allaman Wath).

At the present time much interest in place names is being shewn. A great scheme is afoot, under the direction of Professor A. Mawer, Liverpool University, for a comprehensive Survey of Place Names, pertaining to the whole of England, and the zeal of its director, the organisers and the helpers, augurs well for its success.

ENDING IN DALE.

Givendale (Great and Little)
Bartindale
Brackendale
Danesdale
Slaysdale
Weltondale
Kendal
Thixendale
Whitedale
Yorkdale, and very many others

ENDING IN FLEET.

Broomfleet
Faxfleet
Marfleet
Orwithfleet
Potterfleet
Stillingfleet
Yokefleet

ENDING IN HOLME.

Balkholme
Benningholme
Bewholme
Brackenholme
Cattleholmes
Fairholme
Hempholme
Holme (Spalding)
Holme on the Wolds
(Beverley 6 miles)
Newsholme
Nunburnholme
Sandholme
Stanningholm
Waxholme
Witoholme

ENDING IN BURN.

Auburn
Battelburn

Bourne
Eastburn
Kirkburn
Melbourne
Naburn
Sherburn
Southburn

ENDING IN BOROUGH.

Aldbrough
Flamborough
Hemingbrough
Londesborough
Owbrough
Ringborough
Scorborough
Brough

ENDING IN WITH.

Bubwith
Cottingwith
Epplewith
Langwith
Skipwith

ENDING IN SEA.

Hornsea
Kilnsea
Rotsea
Skipsea
Withernsea
Woodmansea

ENDING IN WELL.

Dunswell
Elmswell
Harswell
Rimswell
Raywell

ENDING IN FIELD.

Driffield
Duffield
Hatfield
Kelfield
Leckonfield

MISCELLANEOUS ENDINGS.

Aike
Arnold
Arras
Beeford
Bellasize
Bennet
Birdsall
Blacktoft
Blanch
Booth
Boreas, Hill
Borsea
Boss, Hill
Braffords
Burland
Catfoss
Cave (North and South)
Caville
Cliffe (North and South)
Colden
Cotness
Dringhoe
Drypool
Ellerker
Escrick
Eske
Fangfoss
Fimber
Fitling
Fordun
Foxholes
Fulford
Ganstead
Gembling
Gilberdike
Gilridding
Goxhill
Gransmoor
Grovehill
Haltemprice
Hedon
Hessle
Hive
Hollym
Howden
Huggate
Hull
Hythe
Kelk

Killingwold	Wetwang
Kilpin (Howden 2 miles)	Wheldrake
Kilpling Cotes	Wilberfoss
Langtoft	Willytoft
Leven	Winestead
Leavening	Wressell
Lingcroft	
Lissett	ENDING IN TON.
Loftsome	Aughton
Lund	Bilton
Meaux	Brandesburton
Molescroft	Buckton
Newbald	Burton (Constable)
Nunkeeling	Carleton
Nuthill	Dalton (North and South)
Owthorne	Etton
Oxmardyke	Foston
Paull	Grimston (York, 3 miles)
Riccall	Heslerton
Ridgmont	Houghton
Rise	Linton
Roos	Mappleton
Routh	Melton
Ryhill	Muston
Saltagh	Bamton
Saltmarsh	Barmston
Sceff (M. Weighton 5½ m.)	Bempton
Sculcoates	Bolton
Sigglesthorne	Boynton
Skeckling	Brighton
Sketfling	Brompton
Skerne	Burton, Agnes
Skirpenbeck	Burton, Bishop
Sledmere	Burton, Cherry
Southcoates	Burton, Fleming
Spittal	Burton, Pidsea
Stamford Bridge	Camerton
Storthwaite	Catton
Swanland	Coniston
Swine	Deighton
Thearne	Drewton
Thorgumbald	Easton
Thwing	Ellerton
Tunstall	Elloughton
Ufton	Flinton
Wawne	Flixton
Wansford	Folkton
Warter	Ganton
Wassand	Garton on the Wolds
Weel	Garton-in-Holderness
Westow	

Grimston, North
 Grimston Garth
 Hayton
 Hilston
 Holmpton
 Humbleton
 Kingston (upon Hull)
 Knapton
 Langton
 Laxton
 Little Weighton
 Lutton (East and West)
 Market Weighton
 Marton (Bridlington)
 Marton (Holderness)
 Melton
 Middleton
 Nafferton
 Newton (6 or 7 in number)

Norton
 Octon
 Preston
 Reighton
 Riston
 Rowton
 Rowlestion
 Rudston
 Ruston Parva
 Sancton
 Scampston
 Seaton
 Seaton Ross
 Shipton
 Skelton
 Speeton
 Staxton
 Sutton (four in number)
 Tanston
 Thornton
 Tickton
 Upton
 Welton
 Weston
 Wilton
 Wilton, Bishop
 Wyton

ENDING IN INGTON.

Dunnington
 Eastrington
 Knedlington

Binnington
 Bridlington
 Dimlington
 Easington
 Elvington
 Heslington
 Leppington
 Lockington
 Millington
 Patrington
 Pocklington
 Portington
 Rillington
 Settrington
 Skirlington
 Spaldington
 Walkington
 Waplington

ENDING IN BY.

Aldby
 Anlaby
 Asselby
 Barlby
 Barmby
 Barnby
 Beilby
 Belby
 Bessingby
 Burnby
 Carnaby
 Duggleby
 Ellerby
 Ferriby
 Firby
 Flotmanby
 Garraby
 Gunby
 Hunmanby
 Kexby
 Kirby Grindalyth
 Meltonby
 Moorby
 Osgodby
 Risby
 Scalby (South Cave 5½ miles)
 Scoreby
 Skidby
 Thirkleby (Malton 8 miles)
 Thirkleby (part of Swine)

Tranby
Uncleby
Woolle
Willerby
Willerby (Hum. 6 m.)

ENDING IN HAM OR AM.

Acklam
Aigham
Aigam
Arram
Basham
Briham
Cottam
Cowlam
Crean
Egham
Esham
Godmanham
Halsham
Harpham
Hotham
Howsham
Kilham
Kirkham
Laytham
Metham
Pluckham
Thornham
Wharrham
Wikeham
Yapham

ENDING IN INGHAM.

Brantingham
Cottingham
Everingham
Frodingham
Keyingham
Ottringham
Ripplingham
Sevingham
Wintringham
Yeddingham

ENDING IN LEY.

Bentley
Beverley

Ella (Elveley)
Filey
Hunsley
Lilley
Rowley
Skirlaugh (Scireley)
Sproatley
Weedley

ENDING IN WICK.

Atwick
Baswick
Beswick
Bewick
Bonwick
Burstwick
Butterwick
Catwick
Cranswick
Elsternwick
Etherdwick (Hedon 7 miles)
Garwick
Greenwick
Kilnwick (Percy)
Kilnwick
Neswick
Owstwick
Sunderlandwick
Treswick
Welwick
Withernwick

ENDING IN THORPE.

Addlethorpe
Atherthorpe
Babthorpe
Barthorpe
Belthorpe
Boythorpe
Bugthorpe
Burythorpe
Caythorpe
Danthorpe
Dowthorpe
Easthorpe
Empthorpe
Everthorpe
Foggarthorpe
Frasorthorpe

Fridaythorpe	Mennythorpe
Gowthorpe	Menthorpe
Gribthorpe	Mowthorpe
Grimthorpe	Owsthorpe
Hagthorpe	Peasthorpe
Harlethorpe	Pockthorpe
Haysthorpe	Raisthorpe
Helperthorpe	Swaythorpe
Hilderthorpe	Thornthorpe
Kellythorpe	Tibthorpe
Kennythorpe	Towthorpe
Langthorpe	Wilsthorpe
Lowthorpe	Youlthorpe

The following are mentioned in Domesday Book for East Yorkshire but cannot be identified:—

Arnestorp	Rageneltorp
Chetelstorp	Scarthiztorp
Crachetorp	Steintorp
Fuletorp	Sudonitorp
Geduualestorp	Toletorp
Lanulfstorp	Toruelestorp
Rudterp	

SUMMARY OF TERMINATIONS.

Number ending in	TON	...	...	...	...	...	...	109
" "	THORPE	...	...	...	...	...	...	42
" "	HAM	...	...	...	...	...	...	35
" "	WICK	...	...	...	...	...	...	21
" "	HOLME	...	...	...	...	...	...	15
" "	DALE	...	...	...	...	...	...	10
" "	BURN	...	...	...	...	...	...	9
" "	BOROUGH	...	...	...	...	...	...	8
" "	FLEET	...	...	...	...	...	...	7
" "	SEA	...	...	...	...	...	...	6
" "	WELL	...	...	...	...	...	...	5
" "	WITH	...	...	...	...	...	...	5
" "	FIELD	...	...	...	...	...	...	5
" "	FORD	...	...	...	...	...	...	4
" "	TOFT	...	...	...	...	...	...	3
" "	STEAD	...	...	...	...	...	...	2
" "	BY	...	...	...	...	...	...	35
" "	LEY	...	...	...	...	...	...	10

GEOLOGY OF THE EAST RIDING OF YORKSHIRE

IN the past Yorkshire has been favoured by the attentions it has received from many of the pioneers in the science of Geology : William Smith, Buckland, Young and Bird, Phillips, Bean, Williamson, Hudleston, Sorby, Judd, Clement Reid and Mortimer of the old school, and Lamplugh, Kendall, Stather, Rowe and Sherburn, and many others in more recent times. The researches of these men have resulted in the elucidation of the geological features of the East Riding, and present day workers must respect their achievements.

To a greater extent than has any other county, our broad-acred Shire is favoured by the wonderful geological monographs bearing upon its geology, many of which may fairly claim to be classics. The magnificent volumes on the Survey of the Yorkshire Coast by Young and Bird ; the three editions of Phillip's "Geology of Yorkshire" ; the "Rivers, Mountains and Sea Coast of Yorkshire" by the same author ; Buckland's "Relique Diluviana" ; the epoch making papers which have appeared in the publications of the Geological Society of London and of the Geological Association, and the various monographs and memoirs published by the Geological Survey relating to our county, form quite a substantial library in themselves.

A perusal of these volumes gives profound respect for the work of the pioneers, work which in many cases

has stood the test of time. True, in certain details ; for example, in regard to the nature and origin of the drifts, and in the detailed measuring and zoning of the secondary rocks, recent painstaking work has added information of value, but, broadly speaking, the main conclusion arrived at by the pioneers, notably Phillips, still stand, and the volumes by the first secretary of



CLIFFS NEAR FILEY, SHOWING BOULDER-CLAY ON OOLITIC ROCKS.

the British Association, the then Curator of the Museum at York, still hold the field for clear descriptions of the principal geological features of the area.

The geology of the East Riding of Yorkshire is comparatively simple. In its north-eastern extremity is Filey, with its famous Brig of Oolitic rock stretching out to sea as an enormous natural breakwater. Southeast thereof is the fine promontory of Flamborough Head, the eastern extremity of the chalk wolds (at

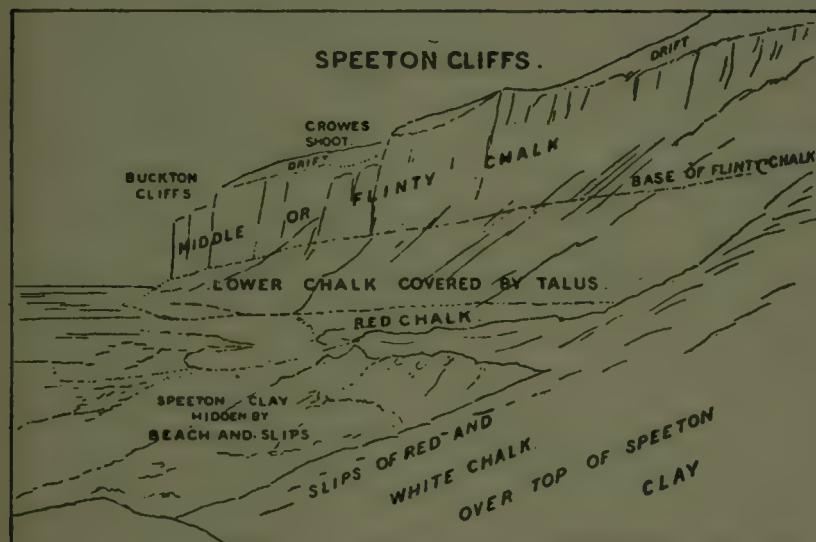
Bempton over 400 feet in thickness). These Wolds sweep in a semi-circle through Bridlington, Sledmere, Driffield, rising to about 800 feet O.D. at Garrowby Hill, to Hessle. At the north-eastern edge of this area are beds in the Red Chalk, slight exposures of Kimeridge Clay; in the south-western portion magnificent sections in the Kellaways Rocks and sands, Millepore Limestone, and the Liassic beds. These escarpments, which extend from north to south, are flanked by blown sands from the Triassic Vale of York, and these sands produce the fertile ground so famous for root crops.

On the north escarpment few sections occur in the Oolitic Beds, but in the north-west corner of the Riding is the classical area of North Grimston, Malton, and Langton Wold, with its wonderful sections in the various beds of the Oolitic series, which yielded so much to Hudleston and other workers. These beds are developed on lines rather different from similar series on the coast in the North Riding, and those in the more southern counties. The beds are particularly fossiliferous, and exposures occur in the Coral Rag and Coralline Oolite. The various railway sections and limestone quarries in this area have long been known as excellent collecting grounds.

One of the remarkable features of the geology of the Riding is the Market Weighton axis, which seems to have been a centre of movement for a considerable geological period. Many of the extensive deposits of the Riding end in a feather edge on the anticline in this neighbourhood. At the present time, at the rifle butts on the railway side between Market Weighton and Goodmanham, the lower chalk and pink bands rest directly on the Lias shales with typical fossils, the

whole of the intervening Oolitic beds being unrepresented at this point.

Between the Kimeridge Clay in Filey Bay and the Red Chalk, there occur at Speeton a remarkable series of deposits known as the Speeton Clays, which are developed here in a way not represented elsewhere in the country. These were investigated by Judd, and later by Lamplugh, and also by the Russian geologist,



SPEETON CLIFFS (after Lamplugh).

Pavlow, and the patient researches of these workers, covering many years, have enabled the deposits to be zoned principally by the aid of the ammonites (Judd), and Belemnites (Lamplugh) in a way which future geologists will probably never have an opportunity of doing, as in recent years land-slips and the growth of vegetation have entirely hidden the nature of the beds.

The chalk area itself contains hundreds of sections, on the coast, in the dry valleys, in artificial quarries, railway cuttings, etc., and these enable collectors to

secure representative fossils from the highest beds of the Upper Chalk, right through the series to the Red Chalk. Through the researches of Hill, Lamplugh, Jukes-Browne, Rowe and Sherborn, and members of the Hull Geological Society, the stratigraphical and palaeontological features of the Yorkshire Chalk are well known, though it is still possible to add to our knowledge of the contained fossils.

Possibly of Pre-glacial Age, though certainly entitled to the term generally applied to it, Infra-glacial, are the remarkable shell-beds originally discovered by Phillips, later described by Lamplugh, and more recently by a committee of the British Association. These occur between the Speeton Clay and the Drift Beds at an elevation of eighty feet above sea level, and contain *Tellina balthica*, *Scrobicularia piperata*, *Hydrobia*, etc.

The Pre-glacial, Glacial and Post-glacial features of the East Riding are altogether of exceptional interest. At Sewerby and at Hessle, the Pre-glacial shore-line, practically at the level of the present beach, has been revealed beneath the Boulder Clay, and has yielded remains of the straight-tusked elephant, rhinoceros, reindeer, bison and other extinct species.

The glacial deposits of Holderness, which represent the Terminal Moraine of the North Sea Ice-Sheet, present an almost continuous section in the cliffs between Bridlington and Kilnsea. In the lowermost or basement boulder clay are included masses of "crag" containing various species of Arctic type. These may be seen at suitable states of the tide on the beach at Bridlington, both north and south of the harbour, and at Dimlington; it also occurs at the base of the cliffs in the last-named locality.

Many years ago during alterations to the sea wall at Bridlington, masses of this material were excavated and originally described as a crag *in situ* but they were subsequently proved to be ice-transported masses. Inland, the gravel pits at Burstwick,



RED DEER ANTLERS FROM THE PEAT AT WITHERNSEA.

Kelsey Hill, Brandesburton and Paull have been carefully studied. These gravels yield numerous remains of mammoth, walrus, horse, ox, seal and similar species, together with a numerous molluscan fauna of an Arctic type, doubtless dragged from the bed of the North Sea during the passage of the ice in its journey from Scandinavia; erratics from that country, as well as from Scotland, the Lake District,

Teesdale, and the north-east coast of Yorkshire, all of which are plentiful, giving some indication of the directions of ice movement, which culminated in the rubbish heap called Holderness.

The association of innumerable excellently preserved specimens of *Corbicula fluminalis* with marine shells in the central Holderness gravels probably indicates the great age of the Humber estuary, which, as is proved by borings, originally went straight out to sea somewhere in the position occupied by the township of Withernsea; the Humber's present south-easterly course having been defined by the morainic mound at Paull.

Among the other remarkable evidences of glaciation in the Riding are the striated rock surfaces discovered on the Oolitic rock immediately beneath the Boulder Clay on Filey Brigg, the transported masses of Lias in the drift in Filey Bay, the masses of Speeton and Kimeridge Clay which have been lifted on to the top of Flamborough Headland near the lighthouse (where collecting used to be far more profitable than at Speeton itself); the extraordinary streaks of chalk of varying thickness, representing crushed and kneaded-out boulders, sometimes extending for hundreds of yards, in the Holderness Boulder Clay cliffs; and the shell beds at the top of the chalk at Flamborough.

On the upper parts of the Oolitic rocks at Filey and in the upper layers of the chalk of Flamborough, notably near Danes' Dyke, and near the Lighthouse, the beds are curiously crumpled and twisted into series of W.'s by glacial pressure. River drainage has been interfered with by the damming of channels by drift; thus the Derwent, which originally flowed out to sea as a short stream in Filey Bay, now practically

encircles the Riding in its course, and reaches the sea *via* the Humber.

In the western portion of the Riding are exceedingly important glacial features in the form of Terminal Moraines of the Vale of York Glacier, which have been described with such clearness by Professor Kendall.



BURSTWICK GRAVEL PIT—NEAR VIEW.

Occupying hollows in various parts of the glacial series are the lacustrine deposits, some of which are evidently of great age. These were formerly well exposed on the coast, but in recent years have been largely washed away by the action of the sea. An examination of these indicated a gradual amelioration of our climate from Arctic conditions to those of modern times ; the lowermost deposits containing the dwarf

Arctic birch and other plants of a cold type, the upper beds yielding a flora similar to that obtaining to-day.

As is referred to in another chapter, the East Riding is remarkable for the enormous rate at which its seaboard is being washed away; whole villages and towns having disappeared within the past two or three



CLIFFS NORTH OF HORNSEA, SHOWING STREAKS OF CRUSHED CHALK.

centuries, and also, on the other hand, from the way in which new land has been formed within the Humber Estuary, great areas, such as Sunk Island, Broomfleet Island and Read's Island, having been reclaimed.

In the south-west corner of the Riding are extensive deposits of peat, which were drained by Dutchmen in the seventeenth century, and indicate the former marshy appearance of this part of the country.

THE
LOST TOWNS OF THE HUMBER
AND
LOCAL COAST CHANGES

SPURN Head, one of the few breeding places of the Lesser Tern, Ring Plover, and other rare birds, the home of the beautiful and scarce Sea Holly and other typical maritime plants, a glorious hunting ground for the collector of the rare moths and butterflies, is far from the madding throng, and a naturalist's paradise. On and near it towns have grown, had their little day, and as quickly ceased to be. Its story more resembles fiction than fact, and to-day its low-lying sands cover many pages in a glorious history.

As years go on, the Humber is confined to narrower and narrower channels. A few centuries ago large tracts of land were under water. These, having been reclaimed and embanked, are now producing good crops. Earlier still, the Valley of the Hull and other large areas were tidal arms of the Humber, and the city of Hull itself is built upon an accumulation of silt which was not existing in Roman times.

Not only have these connecting valleys been silted up, but great areas have been reclaimed; some probably so long ago as in Danish times, others more recently. Of comparatively late date are those large areas, Sunk Island, Broomfleet Island, and

Read's Island, though only the last-named is now an island proper.

The growth of Sunk Island can readily be traced by the various maps and charts of the Humber which have been published from time to time. In the earliest of these a mere sandbank is shown; then an island, which increases in size until eventually the

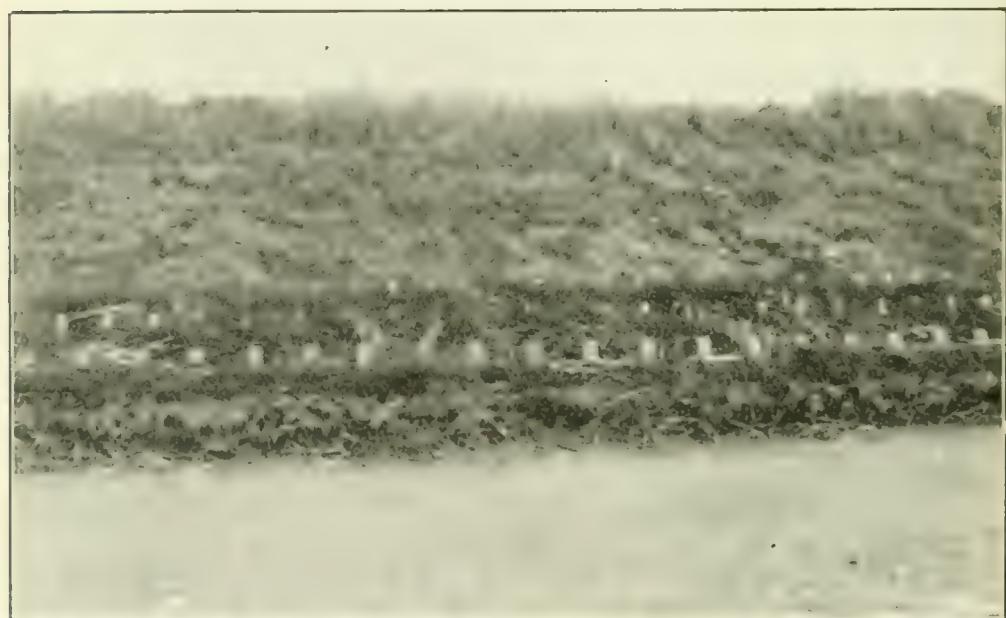


Photo by

C. W. Mason.

NEAR SPURN POINT, SHOWING THE METHOD OF PROTECTION.

channel between it and Holderness is silted up, and the whole is joined to the mainland. So long ago as 1660 two large sandbanks were shown to the west of Spurn, and the gradual growth of these has resulted in the addition of about 7500 acres of excellent farm land to this part of the country. In 1774, 1501 acres had been enclosed; 26 years later Cherry cob Sands were enclosed; further reclamations were made in 1826 and 1850; and in 1880, 2700 more acres were

reclaimed. More recently, in 1897, 347 acres were embanked, and further areas are being reclaimed.

The following are the dates of making junction banks from the mainland to Sunk Island: "1772, the clough at No Man's Friend erected; 1799, Mr. Watt enclosed the growths of Ottringham by a bank at the west lands jetty, which . . . divides the townships of Patrington and Ottringham, and carried the Ottringham drainage waters into Stone Creek; 1819-20, Col. Maister enclosed the west land growths by a bank across the channel to join Sunk Island, and made a communication with it; 1839, Patrington west growths completely embanked, Winestead clough brought down the channel near Patrington Haven mouth; 22nd June, 1841, a good road made over it to Sunk Island."

A century ago large accumulations of sand were formed on the north Humber shore at Broomfleet, west of Brough. By 1820 they had reached a high level above high-water mark. In 1846 James Oldham reported on enclosing 130 acres, but soon afterwards the land began to disappear, and the whole island went, as well as part of the mainland. In 1853 it began to accumulate again, and in 1866 six acres were enclosed. In 1870 there were 60 acres of Broomfleet Island embanked, the channel between the island and the mainland gradually silted up, and by 1900 was entirely closed. At the present day nearly 600 acres have been added to the county at this point.

Read's Island, still an island, is between Brough, in Yorkshire, and South Ferriby, in Lincolnshire. The channels on either side, however, vary; within my memory the shipping has had to change its course from one side to the other two or three times. The

island commenced to form early in the nineteenth century. In 1840, 75 acres were enclosed. In 1861 there were 289 acres embanked. In 1886, 491 acres, 450 of which were enclosed. Since that date the island seems to have ceased growing, and is now being washed away at an average rate of $4\frac{1}{2}$ acres a year; 67 acres having disappeared between 1886 and 1901.

Just as thousands of acres of new land have been



BOYLE'S MAP SHOWING SITES OF LOST TOWNS.

formed within the Humber estuary in comparatively recent times, so in the past, villages, and even flourishing towns, have disappeared.

In 1880, the late J. R. Boyle published a work on the "Lost Towns of the Humber," which was accompanied by a map upon which he indicated what he thought were the positions of the various townships which had been washed away by the Humber. In his preface he stated that he hoped to supplement the book by a similar one dealing with the "Lost Towns

of the Yorkshire Coast." This wish, however, he never fulfilled. Some years later, in 1912, as Boyle's plan had not been carried out, I endeavoured to complete his work by producing the "Lost Towns of the Yorkshire Coast." In dealing with the question of the Lost Towns of the Coast, and in carefully examining the whole of the historical information bearing upon the subject, as well as of the information on maps and charts, I came to the conclusion that in one respect, at least, Boyle had made a very serious error, and that was with regard to the positions of Ravenser and Ravenser Odd. On his map he showed that these occupied positions in the centre of the Humber Channel, to the west of the spit of sand forming Spurn Point. I brought geological, geographical, historical, and common sense evidence and arguments to show that the actual sites of these two places were really to the east of the present Spurn Point, and I was thus able to take them from the Lost Towns of the *Humber* and legitimately include them in my account of the Lost Towns of the *Yorkshire Coast*.

Briefly: in reviewing the evidence at his disposal, Boyle had not taken into consideration the westerly movement of the coastline, and of Spurn Head. The annual loss of seven feet a year, due to coast erosion, means that slowly but surely the sandbank at Spurn Point, which is attached to the south-east extremity of the solid land of Yorkshire, is travelling westward with the coastline. It is attached to the Drifts of Holderness just as a tail is to a dog, and in the same way when the coastline retreats it retreats with it. I have shown* that at various periods the sandbank at Spurn has grown southward towards the Lincolnshire

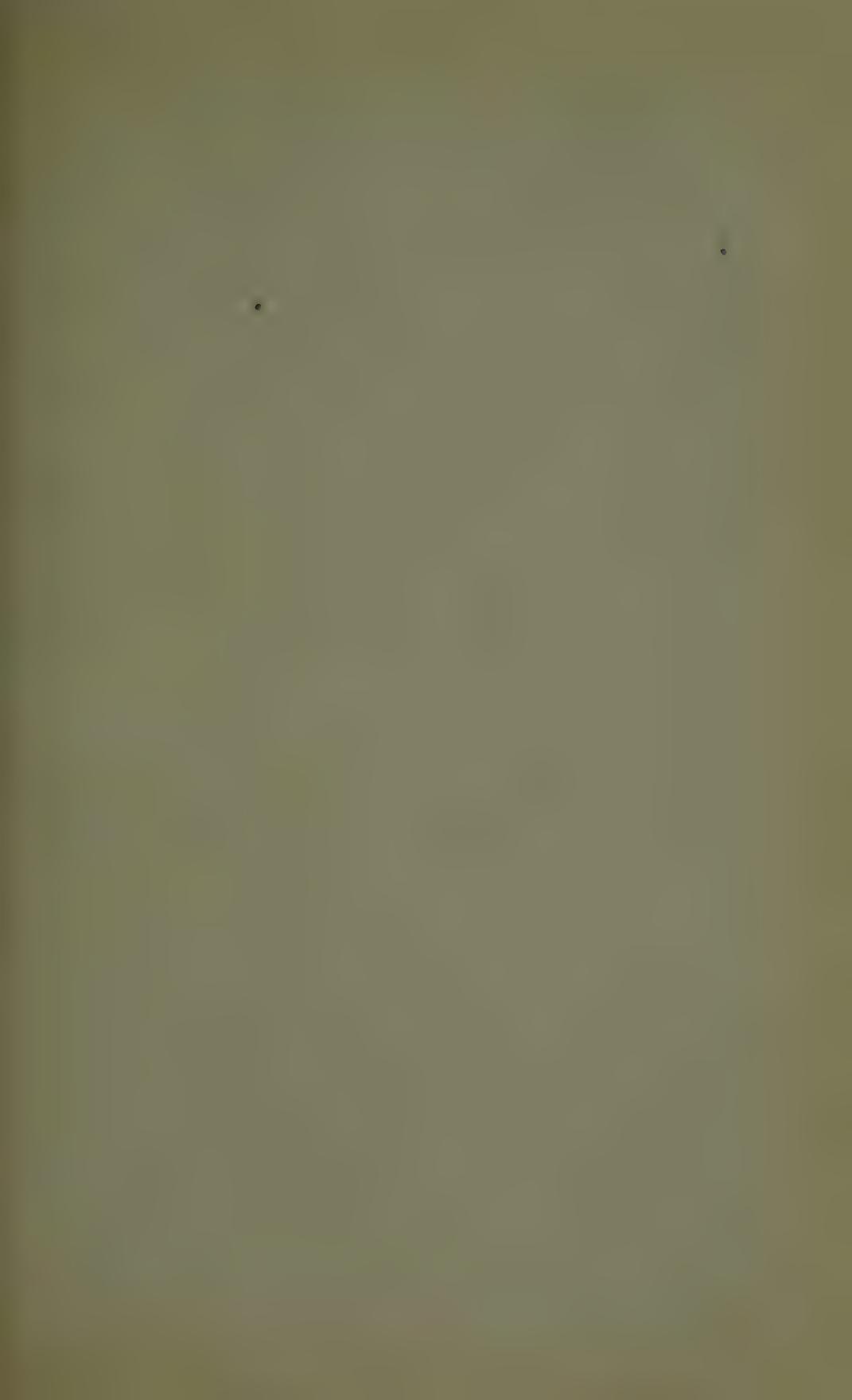
* "Lost Towns of the Yorkshire Coast."

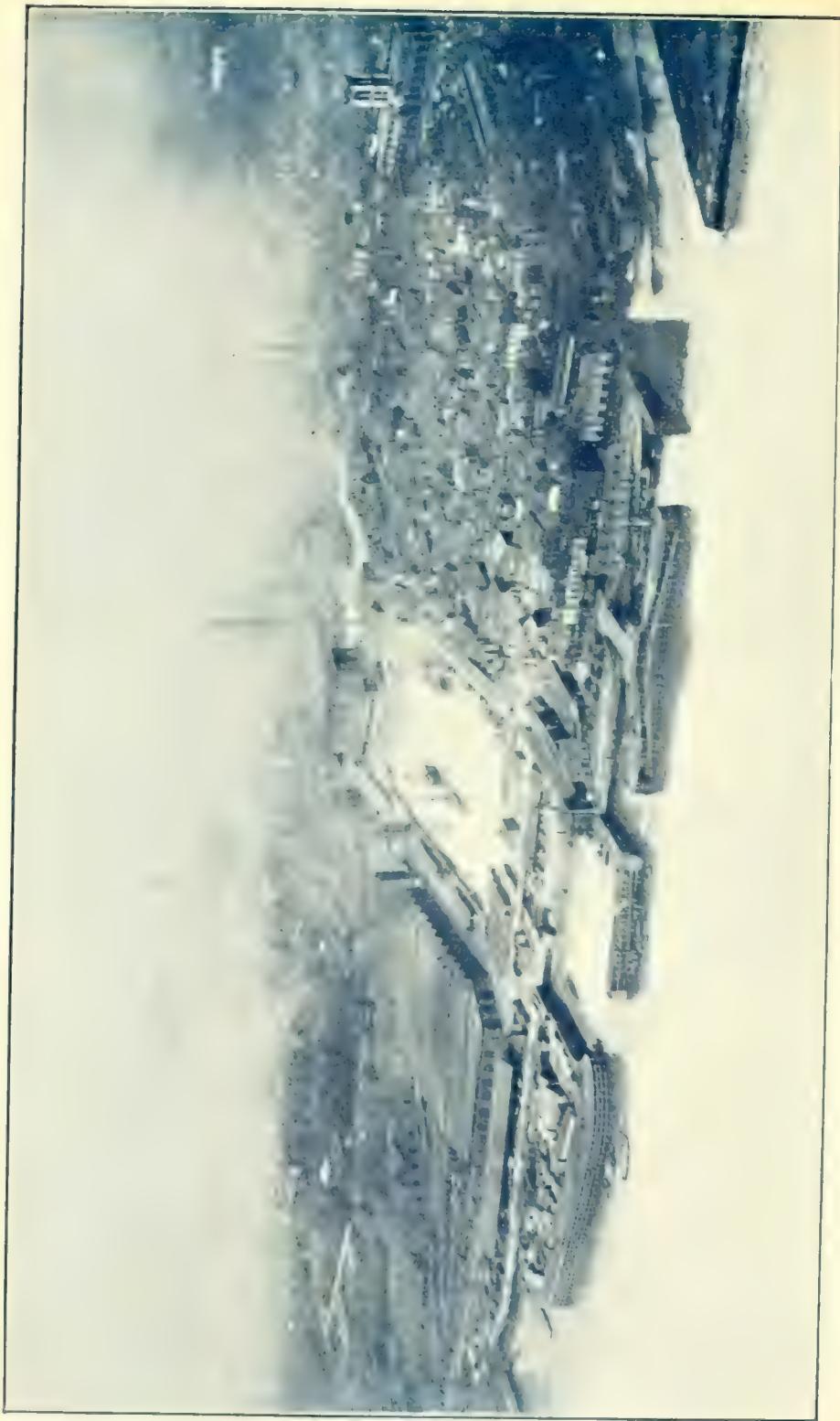
coast until the passage between the Point and that coast became so narrow that the sea or Humber broke through the sandbank, and an island was formed; a new Spurn Head began to grow, and in time the island disappeared as quickly as it grew. I felt satisfied that Ravenser and Ravenser Odd were situated on islands which once formed part of the Spurn sandbank. Consequently, as this sand is regularly travelling southward and westward, the site of these places cannot be within the Humber, and must have been outside the present sandbank.

I am afraid that Boyle, as other writers, was misled by the presence of the "Old Den," or sandbank, which exists within the Humber estuary.

As my volume on the Lost Towns of the Yorkshire Coast had reference to the towns of the coastline only, I did not then pay attention to the remainder of Boyle's book dealing with the townships within the Humber estuary. I felt that having transplanted the sites of his two principal townships from the Humber to the Coast, I had done sufficient for the time being! However, in connection with another piece of work which I have in hand with regard to the evidence afforded by the various topographical maps relating to this area, I have been struck with the persistence of the positions of the banks of the Humber from the very earliest times to the present date; these embankments only having changed as a result of the accumulation of sandbanks and mudbanks at Sunk Island, Read's Island and Broomfleet Island, such accumulations being largely assisted by engineers who have done their best, though not always successfully, to retain them in place.

Geological and geographical evidence also seems





TIDE, PIER AND HUMMER DOCK, HULL

to show that formerly the Humber estuary would be wider, if anything, than indicated on the earliest maps, and that any great erosion causing the disappearance of whole townships would be very unlikely. The deposits of old Humber silt at various places on the sides of the estuary (deposits which are so useful to-day in producing the necessary fine clays for the manufacture of bricks and cement) demonstrate that even within the area shown on the oldest maps there were still wider tracts of land formerly covered by the estuary. Even the whole of the valley of the River Hull itself was at one time tidal, and the river only became confined to a definite channel when the adjoining Humber Banks were artificially heightened, which must have been a very long time ago; possibly as early as the time of the Danes. On this point, however, we have no actual proof, though there is evidence from the positions of early English settlements, which could not have existed until the waters of the Humber had been confined within the artificial embankments.

Of course, it is known that to a very slight extent the side of the estuary, and even parts of the land recently reclaimed, are washed away by the ever-varying currents. The directions of these currents change, and are influenced by engineering works and in other ways. In all these cases erosion has been very slight, and any small villages or hamlets that have disappeared must have been situated quite close to the edge of the old banks, and could not have occupied positions in the centre of the estuary as shown in Boyle's book.

Some time ago I obtained access to a map of the South Ferriby district, dated a century ago. This

showed a field and an avenue of trees in front of the present old Hall near the Humber bank there. I have known this coastline very intimately for over 35 years, and can remember the site of an old Roman well, which is now probably 50 yards from the cliff edge, being only a dozen yards or so therefrom. The slight erosion at this point was no doubt due to a change in the channel, consequent upon the growth of Read's Island or some such cause, just in the same way as at North Ferriby, on the opposite bank, there is evidence that the cliff of drift there has also receded slightly in recent years. At Cleethorpes, too, there has been slight erosion, but these changes have been quite local in character, and of very small extent, and have not been persistent and for all time, as is the case with the erosion of the coast. So far as maps are concerned, the portions of the Humber Bank which have been washed away are so small as to show practically no changes whatever in them, although we have a series of these extending over three centuries.

I am therefore of the opinion, as will be seen later, that some of the places shown as "lost" on Boyle's map should not have been within the Humber at all, but on the coast; others should have been much further north than he indicates, and that these others, instead of "Towns," were in all probability quite small villages, and in some cases mere hamlets. In his book, Boyle very clearly gives the sources of the information upon which his conclusions were arrived at. For the most part he has relied upon the Meaux Chronicle, a transcription of which, in Latin, was edited between 1866-1868 by Mr. E. A. Boyd. The Chronicle itself was written towards the end of the 13th century by Abbot Thomas Burton, and was

continued for a few years by a later writer. Poulson's History of Holderness, and other sources supplied additional information, but the Meaux Chronicle was the most important fount. I understand that the transcriptions which were made from the Meaux Chronicle have been most accurately and most carefully done, and that no important evidence, for or against, supplied by the Chronicle, had been omitted. In this way we are able to quote from Boyle's own work, and to show that it is quite possible to give a different interpretation of the records from the one which he gives.

Quite apart from the geographical and geological evidence of the gradual narrowing of the Humber channel, the maps, so far as we have them, certainly support the views here given. Leland, in his Itinerary, made in the time of Henry VIII., supplies our earliest map of the estuary. Though this is somewhat crude, it is interesting as showing quite a blunt nose at Spurn Point, certainly nothing in the shape of a sandbank, and also a very wide mouth to the Humber ; the villages of Patrington and Preston (though wrongly transposed) being shown comparatively near the shore. When I was at the British Museum some time ago, searching for maps relating to this district, I was fortunate in finding a chart on vellum, which has many points of interest. This is of the time of Henry VIII., though after 1541, as the castle and blockhouses on the east side of the river, shown on the chart, were only erected in that year. Allowing for the exaggeration of the glacial mounds and rounded low chalk wolds into miniature Matterhorns, the membrane has one or two points of particular interest. Chief among these is the fact that an island is distinctly represented

to the east of Spurn Point, and there is another in the centre of the Humber between Spurn and Cleethorpes. There is a view of Hull with its two bridges across the river, and Patrington is connected with the river by means of a channel which has long been silted up.

It looks very much as though the island towards the middle of the Humber estuary may at one time have been connected with Spurn Point, though, on the other hand, the shape and position of the island to the east of Spurn is a little difficult to account for, unless we assume that it is part of a still earlier curve of sand from Kilnsea. Perhaps we should make some allowance for the obvious distortion due to the draughtsman's attempt to give a bird's-eye view of the Humber, rather than a plan.

About the same period was published Lord Burleigh's famous chart of the district, which very clearly indicates a curved bank of sand at Spurn and a wide Humber mouth. On the north bank, and quite close to the water, are indicated the villages of Drypool, Marfleet, Hedon, Paull, Patrington, Welwick, Burstall, Skeffling and Easington.

This map possibly gives a clue to the bird's-eye view already referred to, as a triangular sandbank extending from the Lincolnshire coast towards Hedon is distinctly shown on the earlier plan as a projection from the Lincolnshire shore. Similarly, on Lord Burleigh's chart, extending seawards at right angles from Spurn Point, is a "stone" bank occupying a similar position to that of the island on the other chart. That this is not high and dry, *circa* 1580, is proved by the fact that the deep channel thereon, indicated for shipping, cuts right across it, and this

particular point is shown as "14 f.* deep." This chart is of value as indicating that in Elizabeth's time repairs were necessary on the Humber shore, as it contains a note as follows :—" Breaches on the Humber Banke on the Holderness Side. Two breaches at Sawtey (Saltagh) and one at Welwicke called Bitchecrofte as large as bothe thother ij, ffor the repayring whereof the Quenes Maiesties Landes be chargeable, and therefore the said breaches ought to be made and mended at hyr Highnes Coste expenses and charges, or ellse the countrey and hir Maiesties Lands there will be drowned."

Saxton's, our earliest engraved map (1577), indicates a somewhat stunted Spurn Point, to the left of which is a small island labelled "Den I"; and opposite Ottringham, a small shaded patch labelled "Sunk I.," indicates the beginning of the growth of the land in these parts. Speed's map of 1610 gives no indication of this island, and the same may be said of the various charts published in the different editions of Camden's Britannia, which are evidently based on Saxton's maps. As we go along in date, the gradual changes in the Humber estuary are indicated on the maps published by Moll 1724, Scott 1740, Bowen 1750, Jeffreys 1772, Fayden 1780, Tuke 1786, Poulson 1797, Cary 1805, Greenwood 1834, and others.

In 1820 the Trinity House published a plan indicating the "Situation of the Floating Light at the entrance of the River Humber." This shows a sandbank due south of Kilnsea, but to the east of Spurn, and another one just outside the Spurn Head itself, each being labelled "nearly dry." Of particular interest,

* The 'f' might refer either to feet or fathoms; the latter seems unlikely.

however, is the fact that the Spurn sandbank is indicated with two distinct breaks, in other words, there are two long thin islands in the place of the usual isthmus.

In carefully perusing the various sources of information available to Boyle, one is struck with the fact that in the old chronicles very few references are actually made to the changes in the Humber. In a petition to William de Zouch, Archbishop of York, from the Abbot of Meaux, somewhere about 1342, is the following : " Whereas our manors and lands of Saltagh, Tharlesthorp, Frysmeriske, Wythfleet, Dymelton and Ravenserodd, and the lands, pastures and other places belonging to the said manors, with which our monastery was endowed from ancient times, to the amount of £250 every year, from which also the greater part of our sustenance was well known to arise, were situated on the shores of the water of the Humber and the coast of the sea, and were so destroyed every day and night by increasing inundations of the waters, that of those manors, lands, pastures and places in this way destroyed, the true value scarcely amounts to twenty pounds a year, and, what is worse, from day to day they become such waste places, agitated by impetuous floods every day and night, that within a short time they will be entirely destroyed and consumed, in a way much to be dreaded," etc. This is one of the few references in the Meaux Chronicle to the waters of the Humber. In practically every other case it is the sea which has been so destructive.

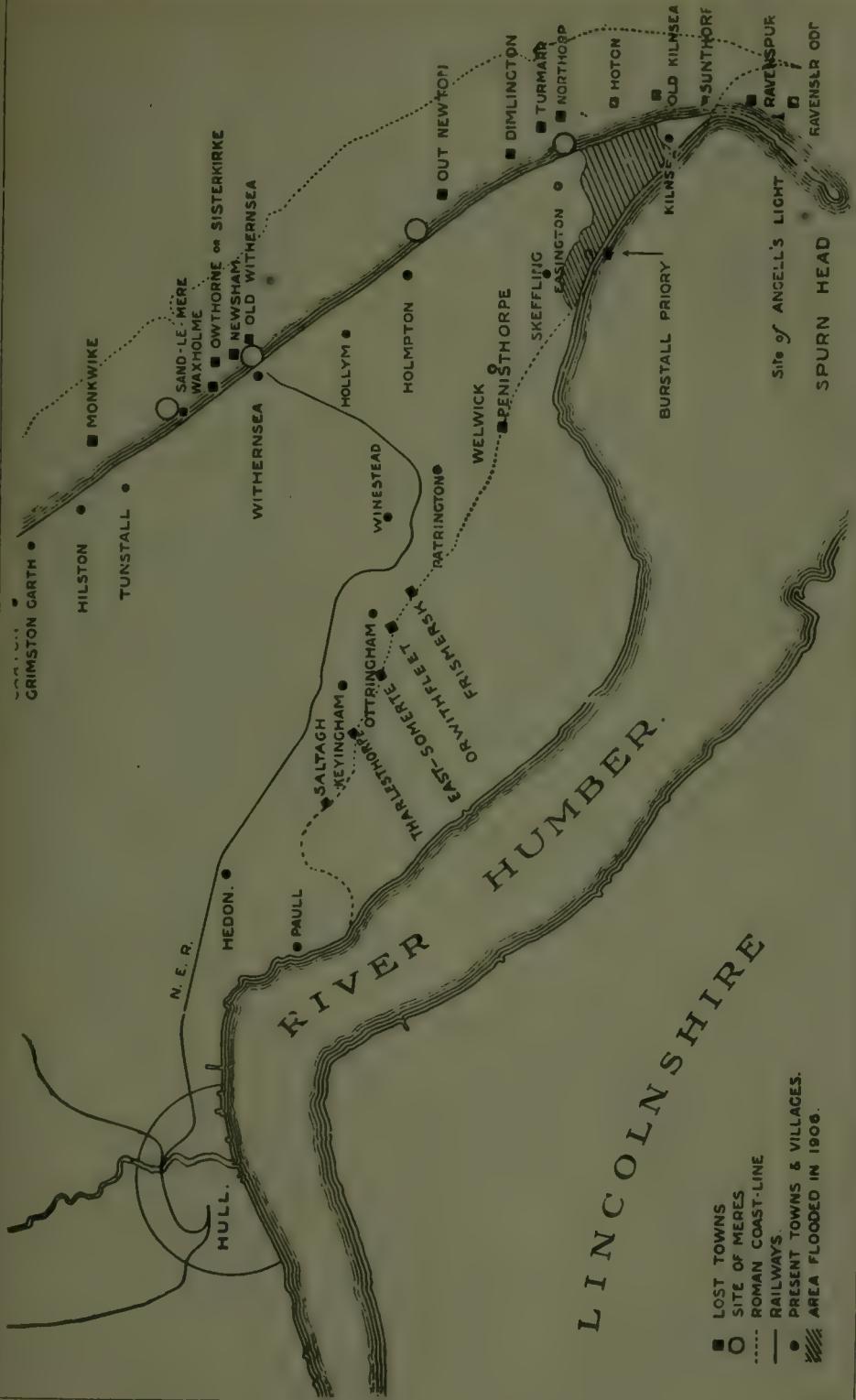
On Boyle's map Sunthorp is placed well within the Humber ; in fact, with the exception of Raven-purn and Ravenser Odd, it is the most southerly place indicated. He shows it due west of Kilnsea, and in a

position somewhere south of Skeffling. The only reference to Sunthorp which occurs in the Chronicle of Meaux which is at all helpful in the way of defining its position is as follow: "Between which towns of Esyngton and Odd, the town of Kylnse and the town of Sunthorpe and the manor of Ald Ravensere in the parish of the church of Kylnse are known to lie mid-way." This statement that Kilnsea and Sunthorp are about mid-way between Easington and Ravenser Odd seems to me clearly to imply that they were adjacent to each other, and must surely have been on the coast. Why Boyle, on the strength of this quotation alone, should have placed Sunthorp several miles west of Kilnsea, and in a position in the Humber where there is absolutely no evidence of their ever having been dry land at all, is difficult to understand.

With regard to Tharlesthorp, Orwithfleet, Frismersk, and Penisthorpe, from the various inquisitions it is clear that these were small villages or hamlets on the north shore occupying a line roughly represented by the north Humber bank on Saxton's, Speed's and other early maps. From various documents recording damage not only to the lands at the places named, but at Saltagh, Myton, Sutton, Drypool, etc., it is clear that the north shore of the Humber, east of Hull, was subject to erosion for a few years, during the fourteenth century, in the same way as the coast at South Ferriby has been in recent times. Naturally, in view of their more serious losses on the coast and at Raven-spurn, the monks at Meaux viewed with alarm the inundations of the foreshore upon which their property rested, and there are many interesting references to the way in which assistance was obtained to embank the disappearing low cliffs of silt, and to prevent

further inundations inland. In some cases these efforts were unavailing, as even the new embankments were washed away, and further banks had to be erected at some distance inland. These floods were doubtless due to exceptional atmospheric and other causes, as shown by the following account given in the Meaux Chronicle : "In that time the sea inundated and passed over its coasts almost throughout the whole eastern part of England ; and the Humber, exceeding its limits, covered the land even to our fishery and wood of Cotyngham and caused the greatest destruction, both of men and animals, insomuch that in a certain town of this country there died by water no fewer than 36 persons of both sexes, and of every age. Whence we incurred inestimable injury ; for we lost our men and oxen at Orwythfleet, and many of our lands at Saltagh and Myton, without any recompence, were entirely washed into the Humber. In which places, and also at Tharlesthorp, Sutton, Drypule and the Fishery, we lost all our moveable goods, and nearly all the buildings, besides men and the lower animals. Wherefore those our lands remained almost sterile, and produced us scarcely any fruits. But after the inundation, in process of time, it came to pass that those our lands of Tharlesthorp, Orwythfleet and Saltagh, near the Humber, by the inundation of the Humber gradually decreased, so that the water of the Humber entirely took away from us the land of Orwythfleet, consumed the grange of Tharlesthorp, and caused us completely to remove all the buildings of the grange of Saltagh, that they might be rebuilt further away from the said inundations."

It thus seems evident that some of the alleged lost Humber towns were actually on the coast ; others



were certainly on the old north bank of the estuary, and not where the water now is.

The map on page 297 shows the probable actual sites of the "lost towns."

Among the places which have disappeared are Tharlsthorp, Frismersk, East Somert, Penisthorp, Orwithfleet, Sunthorp, Ald Ravenser, and Ravenser Odd.

With regard to Ravenser, this place seems clearly to have originally been a Danish settlement. The first part of the word relates to the Danish standard, a raven, and the second portion, *cyr* or *ore*, "denotes a narrow strip of land between two waters." It is interesting to remember that Ravenser is referred to at least three times in ancient Icelandic literature in connection with the battle of Stamford Bridge, references to which in the Saxon Chronicle are well known. The following passage relating to the departure of the fleet from Ravenser is of interest in this connection :—

"Olaf, son of Harold Sigurdson, led the fleet from England, setting sail at Hrafnsseyri, and in the autumn came to Orkney." Of whom Stein Herdisson makes mention :—

"The king the swift ships with the flood
Set out, with the autumn approaching,
And sailed from the port called
Hrafnseyri (the raven tongue of land).
The boats passed over the broad track
Of the long ships; the sea raging,
The roaring tide was furious round the ships' sides."

The once flourishing seaport of Hedon, which sent three members to Parliament, and still possesses valuable Corporation plate, including the oldest mace in the country, is now a quiet country town of a

thousand inhabitants. It is to-day about two miles distant from the Humber, and the old docks and waterways, now in grass fields, can still be traced. Its official seal—a sailing ship manned—seems to be all there is bearing upon its one-time connection with the sea. A narrow meandering creek at high tide now allows very small craft to approach a town which once supplied ships and men to the King's Navy.

It will thus be seen that in some instances ports have disappeared simply from the fact that they have been entirely washed away by the sea, and consequently their trade has been diverted to other channels. In the case of Hedon, however, the silting up of its connecting creek with the Humber, has closed Hedon as a port.

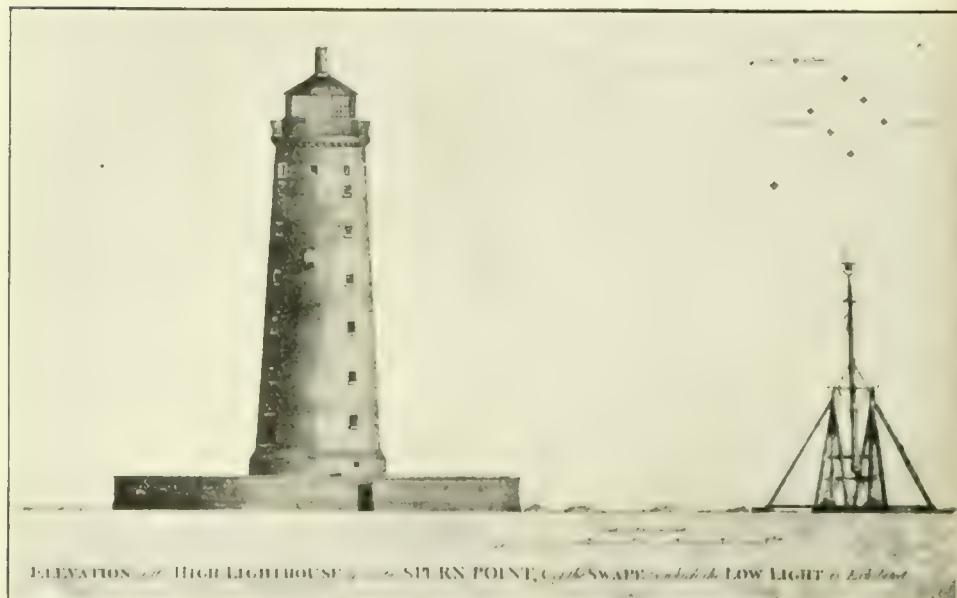
Spurn Point, instead of being a hard rocky promontory, as might be inferred from its shape as shown on the map, is a low-lying bank of sand and shingle, which for its stability largely depends upon the roots of the marram grass, and groynes or other artificial methods of protection.

Spurn Point owes its existence to the material carried down the Yorkshire coast by the tides, which has fallen on meeting the waters of the Humber. The southerly and easterly directions of the waters of the North Sea and the Humber respectively define its shape. Year by year the point extends southwards and westwards. The rate of growth can be ascertained by reference to plans, as well as (in recent times only) by actual measurement. On account of the shipping it is necessary that a lighthouse should be as near the extremity as possible. As the point grows, the position of the lighthouse has to be altered. The rate

of growth of the point can be gathered from the following particulars :—

In 1428 Richard Reedbarowe, the hermit of the chapel at Ravensporne, obtained a grant to take toll from the ships for the completion of a tower, which he had already begun as a lighthouse.

In 1676 a patent was granted by Charles II. to a



ELEVATION OF HIGH LIGHTHOUSE AT SPURN POINT, AND SWAP or SWAY, called the LOW LIGHT or END LIGHT.

THE OLD HIGH LIGHT AND LOW LIGHT AT SPURN IN 1780.
(After Smeaton.)

Mr. Angell for the erection and maintenance of certain lights at Spurn Point, which lights were erected at the request of those interested in the northern trade, who represented that a broad, long sand had been thrown up at the mouth of the Humber a few months previously. Smeaton thought that this sand had afterward become connected with the mainland, and so formed the Spurn Point of his day. Greenville Collins' chart of 1684 shows Angell's Lights at Spurn.

In the Wilberforce Museum at Hull is an interesting letter from Mr. Angell addressed to the Mayor of Hull.

After 1684 the point continued to increase in length, and the lights consequently became useless. An application was therefore made to Parliament in 1766 by the Trinity House of Hull for powers to erect and maintain other lights, which was passed. Smeaton was consulted, and he recommended the erection of two lighthouses.



PRESENT LIGHTHOUSE AT SPURN AND THE OLD LIGHTHOUSE,
NOW IN THE WATER, AND USED AS A MAGAZINE.

In 1771 Smeaton reported that the point had extended 280 yards since 1766, and that it had increased on the sea side to the extent of 50 yards. Many further facts relating to the subsequent changes, of which the following is a summary, are given in my "Lost Towns of the Yorkshire Coast":—

Smeaton's small lighthouse was built in 1771, 280 yards east of the high light. A second was built 70 yards further west in 1816. A third was built 30 yards still further west in 1830. A fourth, 50 yards still further west, in 1831, and in 1863 the sea had reached the high light itself, making a total westerly

advance of 280 yards in 92 years, or three yards per annum. The low light in 1860 stood on the Humber side of the high light. The new lighthouse at Spurn is 71 yards north of that built in 1831.

According to Shelford, between 1676 and 1851 the southerly extension was 2530 yards, or 44 ft. per annum. Between 1851 and 1888 the high-water line extended 600 ft. in a southerly direction, or 17 ft. per annum. During the same period, the westerly movement was 8 ft. per annum on the North Sea side, and 17 ft. per annum on the Humber side, a net yearly increase in the width of the point of 9 ft.

The foregoing information gives some idea of the rate of movement and accumulation of the sand and shingle at Spurn, but this represents only a very small proportion of the material washed from the Holderness cliffs; all the clay and a great proportion of the sand and pebbles finds its way to the North Sea.

There is no doubt that a time will come when the flow of the waters of the Humber will prevent the further southern extension of the peninsula; or, if the growth towards the Lincolnshire shore continues, a break must occur in the present sandbank. As it is, it is fairly evident that under favourable conditions pebbles, etc., are carried across the estuary to Lincolnshire. No doubt such changes as those referred to have frequently taken place. On more than one old chart an island is shown where the peninsula now is. It seems clear that the old town of Ravenser, which existed on an island at the Humber mouth, but which was gradually washed away, must have had its foundations on a portion of Spurn Point at one of these critical periods of its career?

So early as the seventh century we have a reference to Spurn, which Boyle found in Alcuin's *Vita Santi Willibrordi*, printed in *Monumenta Alcuiniana* (Berlin, 1873). Wilbord, the great apostle to the Frisians, was born in Yorkshire 657 or 658. His father, whose name was Wilgils, late in his life betook himself "to the promontories which are encircled by the ocean sea and Humber river," where he remained to the end of his days, "in a little oratory dedicated to the name of



THE HOUSES AT SPURN, SHOWING METHOD OF PROTECTING AGAINST EROSION.

St. Andrew, the apostle of Christ." His fame became noised abroad, and he was reported to have wrought miracles. Many resorted to his cell, and the king gave him "as a perpetual gift" certain small patches of land adjoining the promontory that a church might be built there. On his death his bones were laid in his "seaside cell."

Apparently one of the first historical notices of Spurn occurs in the report of an inquest in the third year of Edward I. (1273), in reference to the damage done to Grimsby by the forestalling practised by the

men of Ravenser-Odd. "No doubt the 'oldest inhabitant' came forward to give evidence, and it was through him that the hundreders were informed that some forty years ago or more the sea had at the entrance of the Humber cast up an island consisting of sand and stones, and that William de Fortibus, the then Earl of Albemarle, had taken possession of it, and commenced to build a town thereupon, the name of which was Ravenser-Odd. The date assigned to this event is *circa* 1233."

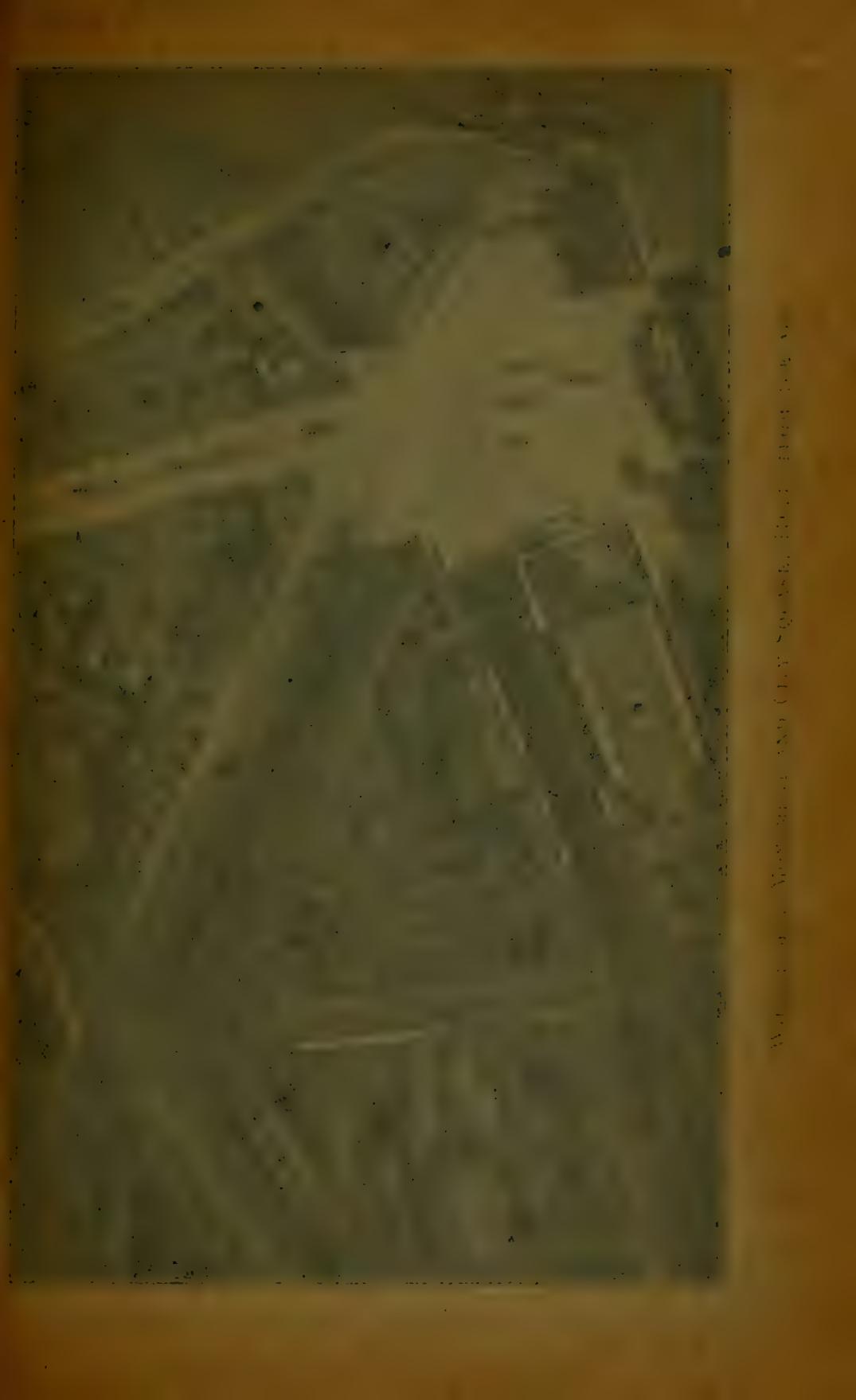
Odd was apparently an island in 1288. At the end of the fourteenth century it is referred to in the "*Meaux Chronicle*" as a peninsula.

Leland, in his "*Itinerary*," gives the earliest known map of the Humber, which, though crude, and obviously inaccurate in many ways, certainly shows no long sandbank at Spurn. Saxton's maps (1577) are apparently next in order of date, though these are very rare, and his maps were copied by Speed a year or two later, and in that artist's "*Theatre of Great Britain*" (1611) they are fairly well known.

In Camden's "*Britannia*" (1586) it is stated that "on the very tip of this promontory *i.e.*, Holderness, where it draws most to a point and is called Spurn Head, stands the little village of Kellnsey."

An early record of the loss of land in south-east Yorkshire occurs in the "*Meaux Chronicle*." In this reference is made to a suit instituted by Sir John of Meaux against the convent for refusal to pay rent on 33 acres of grassland in Orwylfleot, which were carried away by the waters of the Humber between 1310 and 1330. Orwylfleot was apparently on the Humber shore, to the west of Easington.

Tharlesthorp yielded to the monks of Meaux in



WILBERFORCE MONUMENT AND CITY SQUARE, HULL, FROM THE AIR.



1246, 300 quarters of grain, principally corn. In 1277 there were 1274 sheep at pasture in Tharlesthorp, and the land is represented as being so rich that the ewes generally brought two lambs. The monks of Meaux also had a right of pasturage on "The Green" there. In 1336-7 Sir Robert Constable of Halsham died, " siezed of one windmill, eight tofts and four



BURSTALL PRIORY.

(After Pouison).

bovates of land in Tharlesthorp." In 1342-3 Ralph de Bulmere and others were appointed to repair the banks at Tharlesthorpe, Frismersk and other places on the Humber side.

In the fourteenth century the land at Tharlesthorpe, in common with that at Frysmerk, Saltagh, Wythfleet and Dymelton [Dimlington], and Ravenserodd, suffered so much by the sea that its value fell from £250 a year to £50 a year.

Soon after "the sea made further encroachments,

so that only a third of the original estates of Tharlesthorpe (about 60 acres) could be saved, and that by the erection of a costly sea wall." This was during the reign of Edward III. In 1353-6 it is apparent the work of destruction by the waters of the Humber commenced and concluded by the place disappearing altogether about half a century later.

Burstall, or Birstal, is another place that has suffered considerably through the action of the waters of the Humber. "Burstall Priory" was figured by Buck in 1721, but it was then a ruin, and apparently had been for some time. Poulson gives a woodcut as an initial letter to his chapter on Skeffling, in which parish Burstall is situated. The remains of the building, which was an alien priory, have now entirely disappeared, though many of the stones are apparently to be found in the works erected to protect the shore of the Humber at this point. "The first ordination of this house or cell at Byrstall is dated at Beverley, in the month of June, 1210." Several Saxon, etc., coins and other objects have been found on the site of this place, and Poulson (Vol. 2, p. 595) figures a massive Roman bronze brooch, which is said to have been found there. This writer states that "the priory of Burstall is swept away by the frightful encroachments of the sea; and, from the numerous reliques and fragments of other times washed upon the shore below Welwick, it is conjectured that this must have been the site of a populous place."

Burstall Priory is shown on the Humber side, almost due south of Skeffling, on Luke's map of 1786. In the adjoining parish of Welwick were Penisthorp and Orwithfleet, which have now disappeared by the inundations of the Humber.

William Shelford's paper is one of considerable value in connection with our enquiry, notwithstanding the fact that, with the exception of Smeaton, he considers that "all historians of the locality have evidently been conscious of their inability to deal with the physical causes of the events which they are



ALLEGED VIEW OF RAVENSPURNE.

(Probably a forgery).

recording"! He points out that Spurn Point, even in Roman times, must have been 2250 yards at least beyond the present coastline; and that at or near this spot the Danes landed in 867, planted their standard "The Raven," and practically originated the town of Ravensburg, or Ravenser, or Ravenseret, within Spurn Head. The town developed into "one of the most wealthy and flourishing ports of the kingdom."

To-day we cannot even be certain where the place was. The cross now at Hedon is said to be from there, and to have been erected as a memorial to the historic landing referred to, by one "Martine de la Mare." Two church bells, one at Easington and one at Aldborough, near Hornsea, are likewise said to be from Ravenspurn. These apparently are all that exist from this place. We know a Chapel of Ease was built, and was in existence as early as 1272; and we know that it had a street called Locksmith Lane.

An alleged "fifteenth century illuminated manuscript" contains the only view of Ravenspurn in existence. The view represents a church at the end of a fairly wide street, with a row of houses on each side. Towards the centre of the street is a cross. It appeared in an anonymous article on "The Lost Land of England" in the "Strand Magazine" for October, 1901. On communicating with the publishers, Messrs. Newnes, they informed me they were not able to say where the illustration was taken from. The article, however, was evidently written by the same author who wrote "The Story of Lost England." The author was written to, but regretted he could not remember the source of his illustration. This is particularly unfortunate, as no other view of any part of this lost town appears to be extant. From the unusual width of the street shown on the "illuminated manuscript," from the positions of the houses and the church, and also the cross—supposed to be the first view of that now at Hedon—I had my doubts as to the authenticity of the sketch. On enquiry at the British Museum I found there was no such manuscript there, and the authorities agree with me that the illustration "never

came from any fifteenth century illuminated manuscript in the British Museum or elsewhere." It would appear, therefore, that we have yet to see a view of any part of Ravenspurne. It seems to be remarkably like a view of Sutton, near Hull, as it was fifty years ago.

Amongst other items of interest in connection with



VIEW OF SUTTON CHURCH.

The view which evidently "inspired" the artist who drew the alleged view of Ravenser (see page 307).

(*After Poulson*).

Ravenser, we find that in 1296 "Kaiage" was granted to the inhabitants by Edward I. Two years later Ravenser petitioned the king for certain privileges, and offered 300 marks in payment. In 1300 the magistrates of Ravensere were enjoined to stop the export of bullion; in 1305 it sent Members to Parliament. In 1310 Ravensere remonstrated against the depredations of the Earl of Holland, and in the same year Ravenness sent ships for Edward II.'s expedition

to Scotland. Two years later the inhabitants were empowered to levy a tax to defend their walls. In 1323 commissions were issued for the "Wapentak of Ravensere." In 1335-6 warships of Ravensere are referred to, and in 1341 Ravensere sent one Member to "a sort of" Naval Parliament of Edward III. In 1346 one ship only was sent by Ravenser to the siege of Calais, (Hull sent 16). In 1355 bodies were washed out of their graves in the chappel-yard at Ravenser. In 1361 the floods drove the merchants to Hull and Grimsby; and by 1390 nearly all trace of the town, as such, was gone. In 1413 a grant was made for the erection of a hermitage at Ravenscrosbourne, and in 1428 Richard Reedbarowe, the hermit of the chapel of Ravenserspurne obtained a grant to take tolls of ships for the completion of his light tower. In 1538 Leland refers to Ravenspur in his "Itinerary," which seems to be the last reference to the place. It is not included in Holinshed's "List of Ports and Creeks," which was issued before 1580.

It is interesting to note in this connexion that on the map accompanying Sheldford's paper of 1869 it is clearly indicated how the position of Ravenser may well have been on the east of the present Spurn, though originally on the west of the Spurn of its time. Sheldford gives the probable position of the Holderness coast line in the ninth century, assuming that the rate of erosion has been fairly regular and at $2\frac{1}{2}$ yards a year, which is a reasonable estimate.

Ravenser-odd (also referred to as Odd near Ravenser, Ravensrot, Ravensrood, Ravensrodd, Ravensrode, etc.) probably originated in the early part of the thirteenth century, soon after Ravenser, the adjoining port, came to be of

importance. Ravenser-odd was apparently built on an island.

In 1251 some monks obtained half an acre of ground on which to erect buildings for the preservation of fish, in the burg of Od, near Ravenser. The chronicler of Meaux wrote that "Od was in the parish of Easington about a mile distant from the mainland. The access to it was from Ravenser by a sandy road covered with round yellow stones, scarcely elevated above the sea. By the flowing of the ocean it was little affected on the east, and on the west it resisted in a wonderful manner the flux of the Humber."

In 1273 there was a dispute about a chapel at Od, and this was carried on for some time. In 1300 Edward I. gave some lands in Ravenserodde to the convent of Thornton, in Lincolnshire, and others to St. Leonard's Hospital, York.

In 1315 the burgesses of Ravenserod agreed to pay the king £50 for the confirmation of their charters, and "Kaiage" for seven years. In 1326 the king granted dues and customs in the port of Ravenserod, and about 1336 William De-la-Pole left Ravenserod for Hull. Ravenserode sent a representative to Edward III.'s "Naval Parliament" in 1344, as well as a man well versed in naval affairs.

In 1346 Ravensrodde was one of the places mentioned by the Abbot of Meaux as suffering by the sea. In the following year it was frequently inundated, and in 1360 "Ravenser Odd was totally annihilated by the floods of the Humber and inundations of the great sea."

In 1355 the bodies in the chapelyard, which "by reason of inundations were then washed up and

uncovered," were removed and buried in the church-yard as Easington.

About this time we read the following curious note in the "Meaux Chronicle": "When the inundations of the sea and of the Humber had destroyed to the foundations the chapel of Ravenserre Odd, built in honour of the Blessed Virgin Mary, so that the corpses and bones of the dead there buried horribly appeared, and the same inundations daily threatened the destruction of the said town, sacrilegious persons carried off and alienated certain ornaments of the said chapel, without our due consent, and disposed of them for their own pleasure; except a few ornaments, images, books, and a bell, which we sold to the mother church of Esyngton, and two smaller bells to the church at Aldeburgh. But that town of Ravenserre Odd, in the parish of the said church of Esyngton, was an exceedingly famous borough, devoted to merchandise, as well as many fisheries, most abundantly furnished with ships and burgesses amongst the boroughs of that sea-coast. But yet, with all inferior places, and chiefly by wrong-doing on the sea, by its wicked works and piracies, it provoketh the wrath of God against itself beyond measure. Wherefore, within the few following years, the said town, by those inundations of the sea and of the Humber, was destroyed to the foundations, so that nothing of value was left."

Notwithstanding this, "In the Hedon inquisition of January, 1401, the chapel of Ravenserodde, with the town itself, was declared to be worth in Spiritualities more than £30 per annum."

Kilnsea, the Chilnesse of Domesday, is feeling the effects of the sea more forcibly than is any other place on the coast. Clement Reid records that in 1822 there

was a church and thirty houses ; on the Ordnance map of 1852 there are still six or seven houses shown,

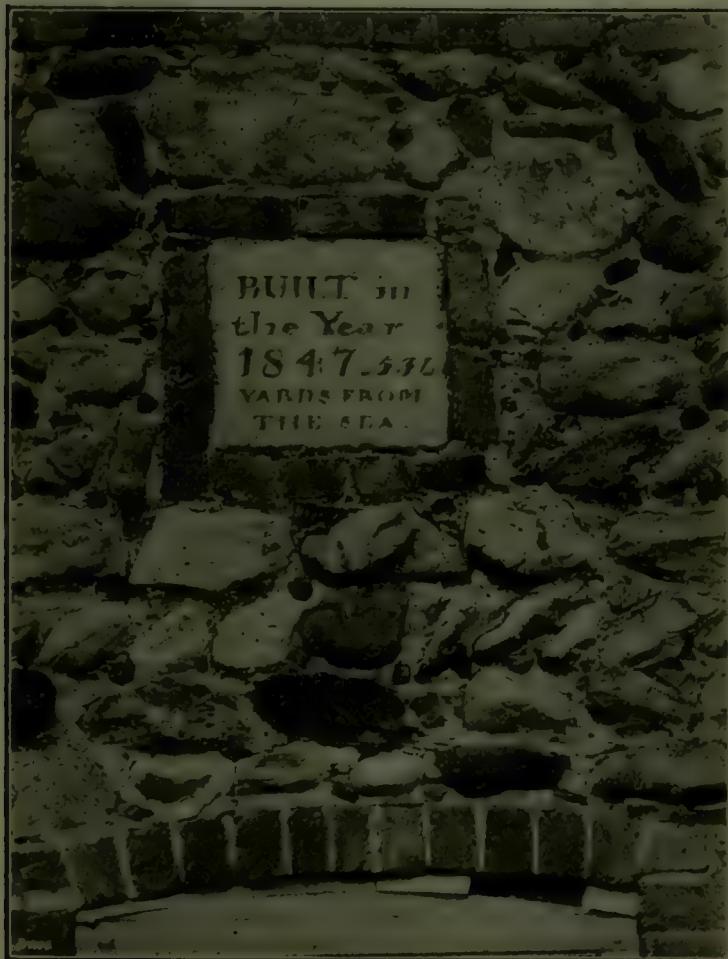


Photo by]

[*Oxley Graham.*

STONE BUILT INTO THE WALL OF THE BLUE BELL INN,
KILNSEA. IT WAS 534 YARDS FROM THE SEA IN 1847.

and the foundations of the church at half-tide. Since then every brick has gone.

Between 1766 and 1833 Pickwell estimates the loss at 1.8 yards per year ; between 1833 and 1876

five yards a year; and between 1876 and 1881, 3.3 yards, a total of 350 yards in 115 years. On the Humber side of Kilnsea also the parish is suffering, though not to so serious an extent. Many interesting facts are also given by Mr. J. Backhouse in a paper on "A Vanishing Yorkshire Village."

The "Blue Bell" inn at Kilnsea was built in 1847, and, according to the record inserted into the wall, was then 534 yards from the cliff. In 1852, it was 527 yards away; in 1876 it was 392 yards away; in 1888, 377 yards. In 1898 Canon Maddock measured, and found it to be $328\frac{1}{2}$ yards away; and Mr. Backhouse (1908) measured it as 200 yards, though an estimate in 1910 (*Naturalist*, 1910, p. 342) gives the distance as 272 yards. This, however, was along the road, which may not have been the nearest point to the cliff. Thus 334 yards of land have been washed away at this point in 60 years, or $5\frac{1}{2}$ yards a year. At Kilnsea Beacon 177 yards were washed away between 1852 and 1886, and a further 50 yards between 1886 and 1898, a total number of 227 yards in 46 years.

Some measurements taken in 1833 are given by Poulson (Vol. II, p. 522), though as most of the places mentioned have since disappeared we are not able to compare them with present-day measurements. But it is perhaps as well to place them on record: "In 1833 the south end of Kilnsea sea bank top, 48 yards; large farm-house front door to the sea, 58 yards; middle of the street in Kilnsea to the cliff, 47 yards; churchyard gate to the edge of the cliff, $25\frac{1}{2}$ yards; remains of the west end of the church, only 4 yards; distance of the same west end to the widest extremity of the churchyard, $25\frac{1}{2}$ yards; middle of the road

entering Kilnsea, below the hill, 10 yards. In 1766 the chancel of Kilnsea church was distant from the cliff 95 yards; suppose the church 30 yards in length, and 4 yards are yet remaining (1833), there is lost 121 yards; but the large masses of stonework have preserved the foundations at least 4 yards, so that the waste is 125 yards, or more, in 67 years, on each side the ruin. These measurements are from the Rev. Jos. Hatfield, curate of Sproatley. It is estimated by Mr. Little that from 1767 to 21st May, 1828, when part of a steeple fell, from a memorandum of Mr. Hunter, many years a resident farmer, has annually lost nearly 3 yards."

The fine stone cross, said to have been erected by one "Martini de la Mare" at Ravenspurne, and supposed to be in memory of the landing there of Edward IV., or possibly Henry IV., "was afterwards removed to Kilnsea, where it stood for many years until removed to Burton Constable, and finally was again removed to Hedon, where it now exists."

Mr. Backhouse records that Philip Loten, father of the Easington naturalist of that name, was born in old Kilnsea, and remembered a road on the seaward side of the old church. As a youth he frequently played on the ruins of that church. The last person buried in old Kilnsea churchyard was a shipwrecked negro in 1823; after which year services in the church were discontinued.

There are many relics of the old Kilnsea church, a list of which Mr. Backhouse gives in his paper. Among them is a portion of a dated memorial tablet (1728), which he gave to the Hull Museum.

According to Phillips, in 1833 the gate leading out

of Kilnsea north field was $327\frac{1}{2}$ yards from the cliff ; the top of the south end of Kilnsea sea bank was 48 yards ; the front wall of the large farm-house, licensed for Divine service, was 58 yards ; the old churchyard gate to the edge of the cliff was $25\frac{1}{2}$ yards ; there remained 4 yards of "ruin of the steeple," and from the said ruin to the extremity of the churchyard was about 95 yards. All this less than 100 years ago, and all gone. The last part of the tower fell in 1831, the first half having fallen five years before. Probably the last few of any portions of the site of old Kilnsea church was when the East Riding Antiquarian Society visited the district in 1890, and were able to get well out at the lowest part at a very low tide. The remains were at a distance of 250 yards from the then cliff top. In 1776 the church at Kilnsea had 95 yards between it and the sea.

The old cross, now at Hedon, was 50 yards from the cliff in 1790, whereas in 1833 its site was 30 yards seaward from the cliff ; thus 80 yards had disappeared in 43 years.

Two fields on the cliff at Kilnsea measured, in 1760, $30\frac{1}{2}$ acres and $9\frac{1}{4}$ acres respectively. In 1827 they measured $23\frac{1}{2}$ and 6 acres respectively. In these two fields alone $10\frac{1}{2}$ acres were lost in 67 years. Records from Tennison's farm, at the north of the village, between 1840 and 1870, show that the loss there has been 5.3 yards a year.

In early times there was evidently a creek at Kilnsea of sufficient size to accommodate, at any rate, smaller craft, as is shown in some of the early engraved maps. Holinshed, about the middle of the sixteenth century, issued a "list of such ports and creeks as our seafaring men do note for their benefit upon the coasts of

England," and includes "Kelseie Cliffe," as well as Horneseie becke, Sister Kirke [Withernsea], Pattenton-Holmes [Patrington-Holmes], Kennington [Keyingham], Pall [Paull], Hidon, Beuerley [Beverley], Hull, Hull-Bridge, Husell [Hessle], etc.

On Lord Burleigh's chart (*temp. Henry VIII.*) the following note appears opposite "Kilnsea": "In calme wether ships of good burden may ride and lande here to do annoaunce to the contreye."

As to the possibility of high cliffs formerly existing at Kilnsea, Thompson, in an "Appendix to his History of Swine" (1824, p. 233), says: "Smeaton, the engineer, noticed the '*high clay cliffe*' of Kilnsea about 50 years ago [*i.e.*, c. 1775], when he visited Spurn Point; and there is no doubt that the land eastward from Kilnsea was formerly of considerable height above the town. A clergyman who had lived to old age in that part of Holderness, and died not many years ago, was heard often to assert that he remembered a field, called *east-field*, lying between Kilnsea and the sea, which greatly rose in height towards the sea, but no *east-field* can now [1824] be found, and there is no doubt that it was all swept away by the sea before the end of the last [eighteenth] century." Poulson, in the extract already given, refers to the road in Kilnsea village "*below the hill*."

Thompson considers that this high land was really the original Spurn *Head*—the later and present Spurn *Point* being the sand heap to the south. In support of this theory he suggests that the Domesday name *Chilnesse* referred to the Chil nessc, or nose, or promontory, and that as the high land was washed away, and the *ness* disappeared, the name became altered to Kilnsea.

To further prove this he quotes Drayton's poem *Poly-Olbion* written 1612-1622 :

" From Kilnsey's pyle-like point, along the eastern shore,
And laugh at Neptune's rage, when loudeth he doth roar
Till Flamborough jut forth into the German Sea.

From which it seems clear to Thompson that " By *Kilnsey's pyle-like point* is undoubtedly meant the high point of Kilnsea cliff, or *Spurn Head*." Kropf opines that Drayton merely had Camden's " *Britannia* " for his information, and had not actually visited this coast, and is therefore not reliable.

Smeaton, in 1771, estimated that the loss of land at Kilnsea was 10 yards a year.

" Practically the whole of the village of Kilnsea has been swallowed up during the past century. The encroachment has been at the rate of 4 yards per annum for many years, with the exception of the past twelve years, during which the average encroachment has been three yards per annum." Groynes have now been erected here by the Board of Trade with satisfactory results.

In 1650 Kilnsea church was considered to be " well seittuate, fit to be continuwed " (in the Parliamentary Survey of the Benefices of the East Riding).

An early reference to " *Kellnsey* " occurs in Camden's " *Britannia*," where the village is described as " on the very tip of the promontory " of Holderness.

In Allen's time (1830-1) it was expected that the ruins of the church tower would " probably exist for a considerable length of time ; the fallen ruins having made a strong bulwark against which the violence of the waves can vent itself without injuring the shattered tower." The final crash actually occurred in the same year that these words were printed !

We learn from a very scarce and scurrilous work, "The Churches of Holderness," by "Geoffrey de Sawtry, Abbot" (1837, p. 11) that "The church has long since been swept away, and the tower, which stood many years after, a valuable landmark for seamen, fell with a tremendous crash, in the Autumn of 1830. There is therefore another churchless village ; but having a population of nearly 200 they have set apart a room for Divine service, in which it is performed every third Sunday weather permitting ; otherwise, it is reported, the worthy pastor, feeling for his flock, grants them an indulgence to remain indoors, and takes the same himself." For many years the bell, which was dated 1700, was suspended over a beam in a stackyard, and was struck by throwing stones at it !

In 1905-6 the low lands from Kilnsea Warren nearly to Easington Lane end on the north, and beyond Skeffling on the west were flooded in consequence of the sea breaking through the artificial banks along the coast. The sea water remained on the land for a long time, the crops were all destroyed, wells were filled with salt water, roads became impassable, and in many ways inhabitants of this part of the country had very troublous times. From the appearance of the district it almost seemed that "history had repeated itself," and that in this neighbourhood the villages were once more to be "blotted out and consumed."

According to the Domesday Survey, "In Esinstone, Morcar had fifteen carucates of land to be taxed ; and there may be as many ploughs Drogo has now there one plough, and thirteen villanes, and four bordars ; having three ploughs and one hundred

acres of meadow. To this manor belows the soke of these—Garton and Ringheborg [Ringborough] eight carucates of land to be taxed; and there may be as many ploughs there. Baldwin has now of Drogo himself there one plough. There is a priest in the church there, and sixty acres of meadow."

According to Boyle, the acreage in Domesday was 2400. In 1880 there were 1300 acres in Easington, a loss of 1100 acres between 1086 and 1880. From a passage in the *New Chronicle* it is apparent that Easington possessed a haven in the fourteenth-century. It is there recorded that Easington church derives some income from the marshes, and some from "le Hawenne," *i.e.*, the haven. As this haven is not given in Holinshed's list of creeks, etc., referred to elsewhere, it had apparently already disappeared in the sixteenth century.

In 1771 the church was 1056 yards from the cliff. When measured in 1833 by Messrs. Hadfield and Pears, the distance was 968 yards. In 1882 it was 850 yards only, an annual loss of nearly two yards in 111 years.

In 1831 John Field surveyed "Ten Chain Close," Easington, which had a frontage to the sea of about half a mile, and it was found that in the 61 years that had elapsed since the enclosure of 1770 a strip of 127 yards wide had been washed away, a yearly average of over two yards.

Only so recently as 1911 Firtholme House Farm, at Easington, consisting of the farm-house and buildings and 130 acres of land, were sold for £650, whereas the mortgagees had lent £4,000 upon it some time ago. This forcibly illustrates the deterioration of

property in this area, partly by floods and partly by erosion.

Mr. Matthews estimates the erosion here "during the past few years" at 5 yards per annum. In the period 1852-1888 it had been at the average rate of 12 feet per annum between Easington Lane end and



Photo by]

[W. S. Parrish.

EASINGTON TITHE BARN.

Kilnsea; and on surveying this stretch in 1898, Mr. Butterfield found that the average annual loss was 10 feet. Between 1852 and 1886 the loss had been 107 yards; and between 1886 and 1898 a further 33 yards, or a total of 140 yards in 46 years.

Mount Pleasant Cottage, built in 1876, bears a stone to the effect that it was then 616 yards from the sea. The lettering on this stone is now almost ob-

literated. The house referred to was formerly occupied by the late H. B. Hewetson, and is now known as The Tower. Mr. R. W. Walker, a later occupant, informed me that the distance in February, 1912, was 470 yards, a loss of 176 yards in 36 years, or over 4 yards a year.

To-day Easington has many places of interest, including a fine old aisled tithe-barn and several old cottages.

Northorp township has disappeared. It was formerly within the parish of Easington. With Hoton it is referred to in a surrender of William De-la-Pole to Edward III. In the "Liber Melsæ," Northorp is called a manor, and according to the same authority, "perished with Hoton, and was all gone in 1306." According to the "History of Withernsea," a "Northropp" is referred to in a document dated 1667; but this can hardly be the same place.

Another township Hoton was once within Easington, and had disappeared in the fourteenth century.

Another place, Turmarr, once within Easington, had also disappeared in the fourteenth century. A field north of Easington, where there is a depression in the cliffs, is still locally known as Turmarr Bottoms.

THE NORTH SEA

By A. N. SOMERSCALES, HULL

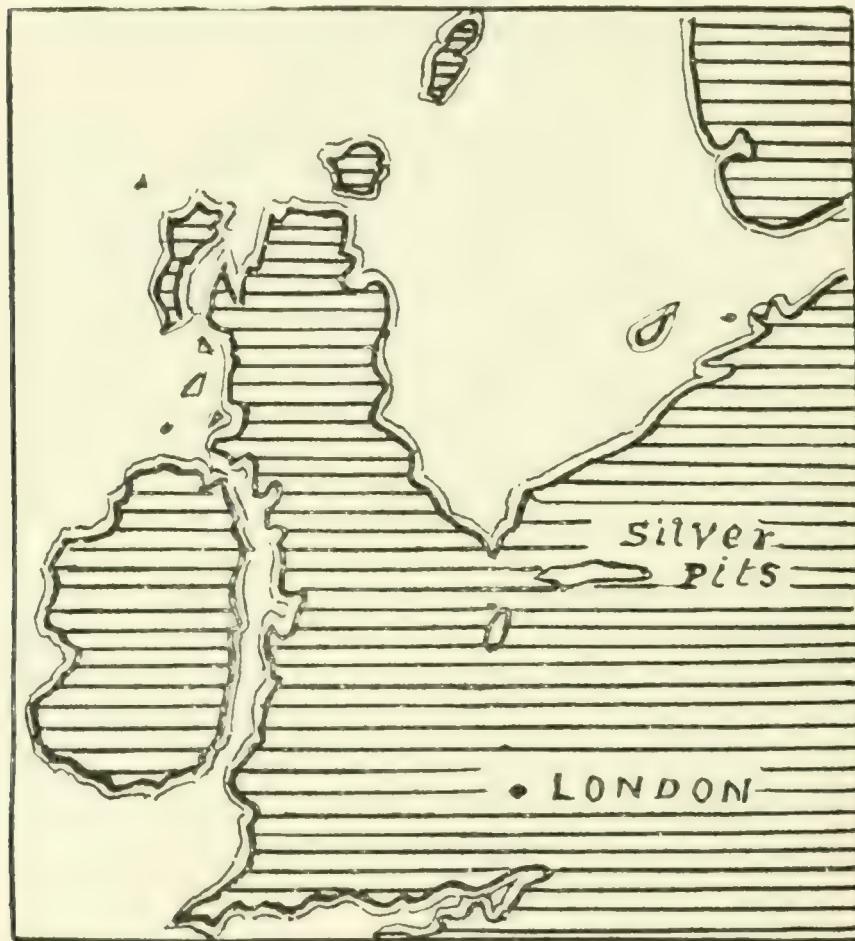
IT has been well said, “The seas but join the nations they divide.” This aphorism could hardly be better exemplified than by the sea, which lies, as it were, at our threshold ; whose tidal pulse sends the welcome flood up our broad estuary, gives our bountiful supplies of fish, affords the much needed recreation to our town-bred people at its numerous watering places, and above all, gives to the Tyne, the Humber and the Thames, the Baltic and the Netherlands, their magnificent and growing trade.

On all accounts the North Sea should be a subject of special interest to the dwellers on the East Coast. Few can say that it exerts no influence on their daily life. All classes are directly or indirectly indebted to it. The Merchant and the Tradesman, the Pilot, the Sailor, and the Fisherman are concerned in bringing or distributing the produce of our own or other countries ; and to this end the Sea is for us the “Highway of Nations.”

Even the farmer must not be made an exception to this. How many thousand acres of rich corn land has the farmer not rescued from the sea in such estuaries as the Humber ? And is not the soil of Holderness enriched by marine deposits and alluvium the value of which cannot be estimated ?

Let us consider briefly the geographical facts about the North Sea ; and, at the outset, point out that a

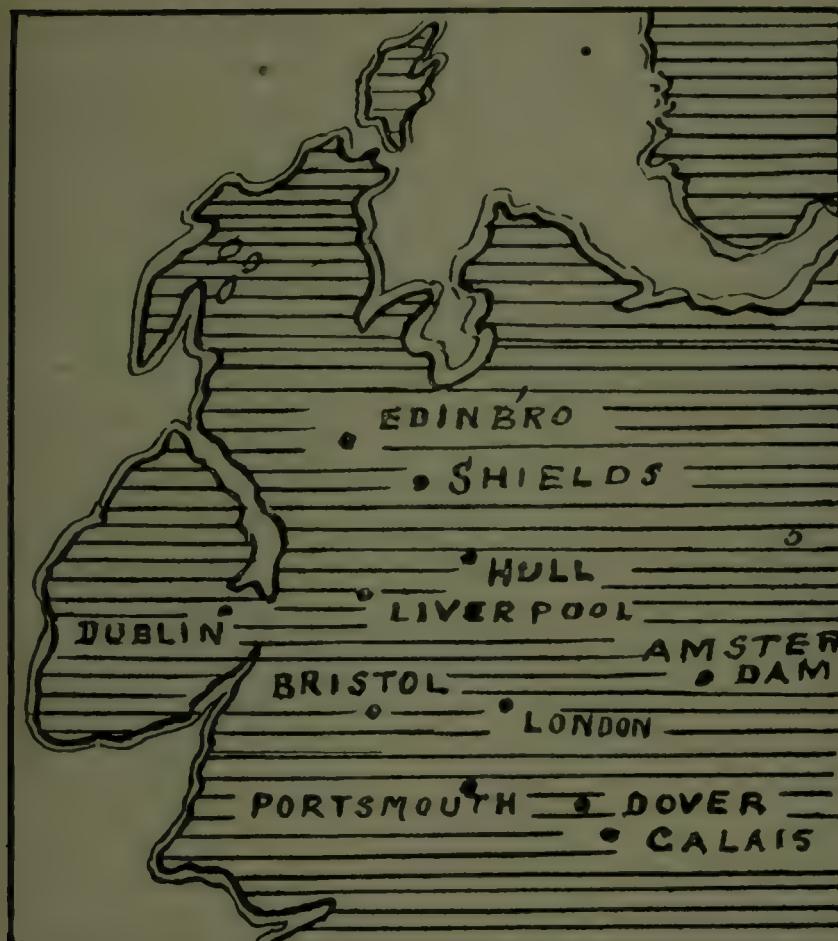
map or chart gives a very misleading idea about the separation of land and water. A map for the purposes of physical geography does not sufficiently emphasise



MAP I. COAST LINE WITH THE SEA LEVEL
DEPRESSED 180 FEET.

the fact that the land sometimes runs under the water by an almost imperceptible slope or inclination, and that in consequence the present coast line is very little guide as to the real form of the land or the permanent limit of the sea. The Zuyder Zee, for example, a few

centuries ago was dry land, with towns and cultivated fields ; now it is a sea, yet the form of the land is the same as ever.



MAP II. COAST LINE WITH THE SEA LEVEL
DEPRESSED 300 FEET.

The present limits of the North Sea comprise an extent of 140,000 square miles, to the N. latitude. It is by far the largest and yet the shallowest of the land-enclosed seas formed by the group of the British Islands. But the British Islands themselves

are naturally a part of the Continent of Europe. The cliffs of Dover reappear at Calais; the East Coast of England to Flamborough Head, is a counterpart of the coasts of Holland and Denmark; and the most northern part of Scotland is connected by the Orkneys and Shetlands with the mountain system of Norway. This becomes still more apparent when we consider the shallow nature of the seas which separate the British Islands from the Continent, as well as those which separate the islands from each other. A moderately lofty church spire (say Patrington Church), would not be covered in any part of the North Sea south of a line drawn from the Tees to the entrance of the Skager Rack (except in those exceptional and local depressions known as the Silver Pits).

In order to realise how intimately the British Islands are connected beneath the water with the Continent, it is sufficient to construct a map showing the coast-line that would exist if the sea level were only a few feet lower. The accompanying outline is a map of this kind, representing a depression of 180 feet in the sea level. It will be observed that the southern part of the North Sea no longer exists, and the English Channel only separates England from France as far as the Isle of Wight, and is miserably narrowed. The Irish Channel is narrowed to 20 miles, and the Hebrides are joined together, the Isle of Man is joined to England, and altogether the character of the British Islands is lost.

The second map is drawn to show the coast-line after a depression in the sea level of 300 feet (less than twice the height of Dimlington cliff). Here absolutely no British isle remains an island, except the group of the Shetlands. Ireland is joined to England, and

England is undistinguished from France and the Low Countries, and the new country or bed of the North Sea. Scotland is a huge promontory, serving to show



MAP III. COAST LINE WITH THE SEA LEVEL
DEPRESSED 600 FEET.

where the British Isles once existed. Observe that Ireland, although increased in size, is little altered in outline by these changes—nor is the coast of Norway.

Finally, let the sea fall 600 feet, or the extreme

height of the Yorkshire Wolds, and we get Map III., in which no trace of the British Islands remains. The coast-line shown here is the real edge of the great plain which extends through Central Europe to the Atlantic Ocean. The sea level might now fall a thousand fathoms without altering materially this coast line, and without exposing more than a few more leagues of land.

The small sketch maps accompanying this article have been drawn by the present writer simply by following the 30, 50 and 100 fathom lines laid down on the Admiralty Charts. It comes to the same thing whether we suppose the sea level to be depressed, or the land to be elevated to the same degree in each case.

THE MAMMALS OF EAST YORKSHIRE

By CHAS. F. PROCTER

THE district covered by a circle of twenty-five miles radius, with Hull as its centre, is not as extensive as it would be if the circle were complete. Half of it is estuarine or Lincolnshire, and the half under review is, by virtue of its physical characteristics, indebted largely to the order RODENTIA for its mammals. These comprise, first in order of prominence, the Rabbit. Although its fossil remains indicate that it was here before our country became an island, it still exhibits a tendency to adapt itself to circumstances; and the rabbits of a district are often peculiar, either in coloration, shape or size. During the war the Rabbit almost became extinct, but its remarkable fecundity is well illustrated by the fact that it is now again abundant in every locality suitable for it.

The Hare is well distributed, and probably some of the best hare country in England is to be found in the area. I once counted 111 hares gathered together in a turnip field near Pocklington during the time when a slight touch of premature winter had covered the country with snow. The field of about 15 acres was on a hill side, swept with the wind. The roots were very poor and gave little cover.

Coursing is a very popular Holderness sport.

The Squirrel is not common except, perhaps, in the conifer plantations of the Wold district, but is sparsely distributed everywhere. The American Grey Squirrel has been taken, but has not, as yet, made a definite invasion. If it does, experience seems to indicate that it does much better than even the native.

The Brown Rat and the Water Vole—like the poor—are always with us, and at times become a pest.

The Black Rat occurs in isolated colonies in the Port of Hull, chiefly in the drains and basements of the warehouses. It is not common in the outlying districts, having apparently been ousted by the Brown Rat.

The Mouse is making merry behind the skirting as I am penning this chapter. It is probably doing this in ninety-nine out of every hundred skirtings in the area.

I have once seen the nest of the Harvest Mouse, but it is rare. The Long-tailed Field Vole and its short-tailed cousin, *Microtus agrestis*, occasionally appear in great numbers, and do a lot of harm to agriculture. They are always abundant, and form the chief diet of the owls and hawks.

I have never seen the Dormouse in the county, and do not know of a record for East Yorkshire.

The Red Bank Vole is well distributed, and in districts is common.

The Order CARNIVORA is represented by the Otter, which is very rare in Holderness, but fairly common on the upper reaches of the River Hull, and the chalk streams of the wolds, where I think it is again increasing.

The Fox is everywhere. When the great war topped all hunting, the fox increased out of all bounds,

and I have many times taken the wing cases of beetles out of their excreta—good evidence of their straitened food supplies, and probably closely relative to the fact of a much diminished head of partridges. Nine cubs were taken out of an earth on a shoot of mine in Holderness during May of this year. This is an unusual number, five or six being much more general.

The Badger is, I believe, like the Otter, more common than is generally suspected. Although he is not in evidence in the plain of Holderness, he is so secretive that he may be in a neighbourhood a long time before he is known, unless his beat is regularly patrolled by a keeper or a naturalist. He is turned out occasionally by the Holderness Hounds in the Wold country.

The Stoat and the Weazel are common. I secured two Stoats during the snow of last winter, which had quite turned their coat, and were pure ermine, with the exception of two small brown spots on the muzzle. A very interesting occurrence of the Pine Marten took place at Lowthorpe in June, 1921. It was a well-grown specimen, but in summer coat. It was trapped after raiding a hen-roost, and was possibly a wanderer from the Lake District.

The Common Seal occasionally occurs along the coast, and I have on more than one occasion seen it at Spurn Point.

The CETACEANS appear on the list for the district on the strength of occasional belated and wandering specimens, which get stranded on the coast, or ascend the Humber. The possible exception is the Porpoise, which, during September or October, regularly follows the Salmon up the estuary. Sibbald's Rorqual (the

skeleton of the type specimen of this species, caught in the neighbourhood, is in the Hull Museum). Bottlenosed Dolphin, Common Rorqual and Beluga have all occurred in this manner.

The order INSECTIVORA includes the Hedgehog, which is common everywhere.

The Shrew, the Pigmy Shrew (the smallest mammal we have) and the Water Shrew are well distributed, while the Mole is more of a nuisance than scarce.

The UNGULATA are only known as park specimens, and do not occur in a state of *Feræ naturæ*.

The Chiroptera are perhaps the only local order of mammals of which we have no very precise data, and a systematic investigation would probably increase the following list considerably: Pipistrelle Bat, Whiskered Bat, Noctule Bat. The Lesser Horse-shoe, Natterers, Daubenton's and Long-eared, might all be recorded if sought for, as they all occur in Yorkshire.

BIRDS OF EAST YORKSHIRE

By E. W. WADE

TO the ornithologist, the East Riding of Yorkshire presents a ground with more varied characters than any other part of the broad-acred shire. Extending from Selby, Elvington and Dunnington, just outside of York, to the North Sea, and from Spurn Point to Filey, it includes a few remains of the old heath and marshes, *e.g.*, Skipwith Common, Allerthorpe Common, Spalding Moor, Cliffe Common, Walling Fen—once stretching from the Humber to Market Weighton and from Holme to Howden—and a large stretch of the Derwent Marshes in the neighbourhood of East Cottingwith, made famous by the exploits of Snowdon Slights, the punt gunner. The chalk Wolds possess traditions of bygone species which no other part of the shire can emulate, fringed on their western edge by extensively wooded and sheltered dales, generally with streams rising from the chalk, and terminating on the north-east in the frowning precipices of Speeton, Bempton and Flambro', famous throughout the British Isles for both their breeding and migratory visitors.

Following the line of the coast from Bridlington south, between the sea and the Wolds, we have a more or less level country of glacial clays and gravels, where there are numerous traces of old lake beds, with a few points of special interest, such as the Driffield streams, and remains of the old marshlands fringing

the River Hull, Hornsea Mere, unique in the county, and the gem of the East Riding, and last, but not least, Spurn Point, one of the most famous of our landing points for migrants, and possessing besides a limited though special population of breeding birds. From the Spurn sandhills extensive mudflats stretch up the River Humber to the mouth of the Trent, populated during the autumn and winter months by numerous flocks of Waders, Ducks and Geese.

The "Birds of Yorkshire" gives the total number of species observed in the county as 325, 123 annual breeders, and 202 migrants or occasional visitors. As most of these occur or have occurred in the East Riding, it is only possible in a sketch of this nature to give a general idea of their distribution on broad lines. In the Hull Museum will be found a fine representative collection of our birds.

Skipwith Common is perhaps the only part of the old heath lands, once so frequent between the Ouse and the Wolds, to retain its ancient characteristics unchanged. A space occupying nearly a square mile remains, with several water holes of fair size, and with extensive adjoining woods. In the water holes the Black-headed Gull, which had frequented the common for about thirty years, owing to the protection given by the late Lord Wenlock in 1893, has increased enormously. In 1910 there were over 800 pairs of birds, and at present about 100 pairs. This is the only permanent colony in the East Riding. The Mallard, Common Teal, Shoveller, Common Snipe and Redshank also breed regularly, and amongst rare breeding visitors the Short-eared Owl, Pochard and Curlew have been recorded. Owing to strict protection the birds are unmolested. The Herons from Stillingfleet, which

HORNSEA MERE.
Nesting place of the Great Crested Grebe and Pochard.



shares with Hornsea Mere the distinction of possessing a Heronry, may frequently be seen in small parties passing overhead or basking in the sunshine among the rushes. The remains of the other heaths and fen lands have been so encroached upon by drainage and the plough that very few of their original bird population remains. A few Mallard, Snipe and Redshank still linger on at Spaldington and Cliffe Commons, and the Peewit is perhaps the most numerous of the birds of this district where once Ruff and Reeve flourished, and numerous species of Duck bred. A succession of wet seasons, such as 1912-13 and 1920, when the old marsh reasserts itself, brings back the Snipe and Redshank to their old haunts, but a dry season banishes them again. Occasionally a visitation of Field Voles, as in 1900, induces the Short-eared Owl, one of our regular winter visitors, to stay and breed. In that year six pairs reared their young on Broomfleet Island, then enclosed, but not ploughed up, and covered with a dense mass of sedges, grass and reeds. In 1910 the birds had gone with the disappearance of the Voles. The most conspicuous breeding species in the area fringing the River Foulness, and forming an offshoot of the old Walling Fen, is the Magpie, which has increased enormously since 1914, very much to the detriment of the smaller species of birds.

The marshes bordering the River Hull and streams near Driffield have a similar resident avifauna. Another sporadic breeder is the Shoveller Duck, which requires an area of shallow sedgy water to provide its special food. In wet seasons, e.g., 1910, the birds visited old haunts on the Lamwath, in Holderness (which assumed its old marshy character), and stayed

to breed, though they have not done so since. Almost every reed bed and brickpond in our old fen land bordering the Humber, Hull, Ouse, and Derwent contains numerous Reed Warblers, Sedge Warblers and Reed Buntings, perhaps the most characteristic avifauna of this district, whilst here and there the Kingfisher, when it escapes the gun, may be found on the streams and land drains. A series of Duck Decoys once existed in the marshes bordering the River Hull, and stretching from Beverley to Driffield and Barmston. These flourished till about 1800, but the drainage of the district from 1798 onwards banished them. They were situated at Watton, Meaux and Scarborough. The old pond and the pipes of Scarborough decoy may still be traced in a plantation near the N.E.R. line. Decoys also existed at Holme, in the old Walling Fen, and at Escrick Park.

On the Derwent marshes, generally dry in summer and flooded in winter, a series of punt gunners flourish, of whom Snowdon Slights, 1845 to 1907, was the most famous. His exploits are recorded by Mr. Sydney H. Smith in the book bearing the name of the old wild fowler.

In the Earl of Northumberland's Household Book, 1512-1514, we have a record of the birds used for the table at his castle of Leconfield, and snared in the marshes of Holderness and Howdenshire. Among these are included—

Cranes, still commemorated in the name of the village of Cranswick

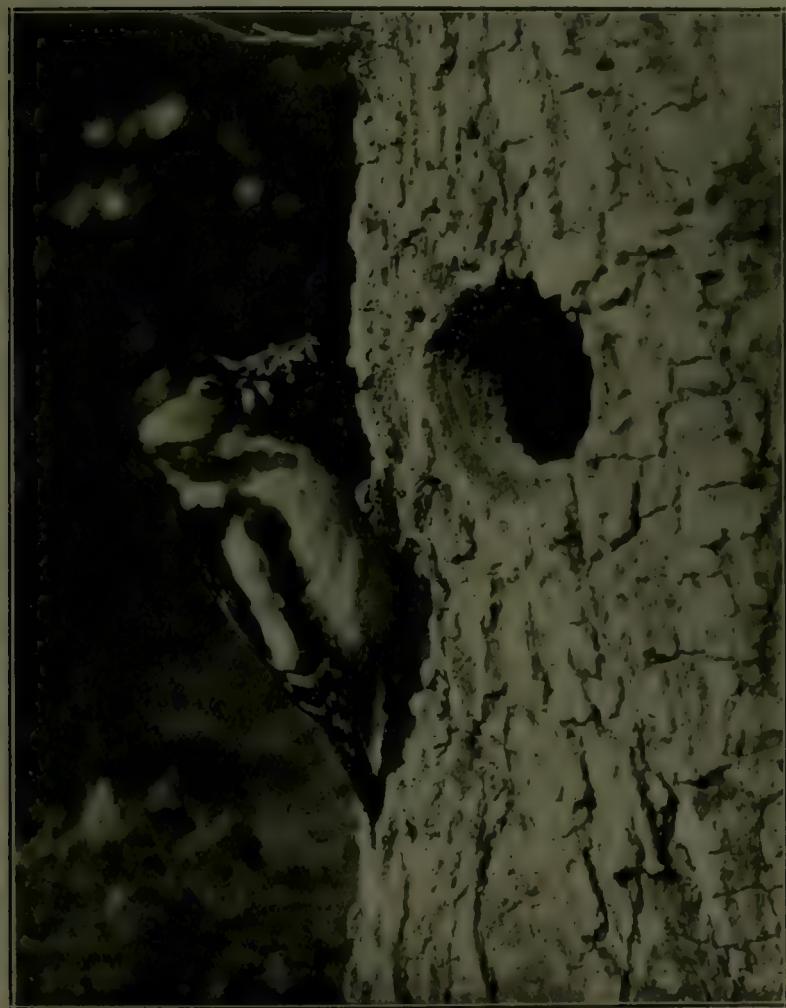
Reys (Ruffs) ; Sholard (Shoveller) ;
Knots (probably including Godwits) ;
Tearns (probably the Black Tern) ;
Swans ; Bitterns ; Geese ;

also Dotterel, Bustards, Curlews, these latter from the higher Wold district. In the district bordering the River Hull, Mr. F. Boyes and the late Johnson Swailes found in 1882 the Spotted Crake and Garganey Teal breeding in the same marshy patch. Modern drainage, however, has obliterated these marshes, and the once numerous population of marsh birds is gone. The only piece of the original marsh remaining is Pulsin Bog and a limited area near Driffield. Here a few Snipe, Redshank, Sedge and Reed Warblers and Reed Buntings alone remain of all the glorious avifauna once resident there.

The drier parts of the heaths at Skipwith, Allerthorpe, Cliffe and Holme are the regular haunts of the Nightjar, which only occurs in the western parts of East Yorkshire and occasionally in some of the sheltered valleys on the western edge of the Wolds.

The western edge of the Wolds contains many well-wooded valleys and well-timbered estates, amongst which the extensive woods of Houghton, Londesbro', Warter and Kirkham are perhaps the most favourably situated for breeding birds. The eastern face is not so well wooded nor so sheltered, but in the neighbourhood of Boynton, Lowthorpe, Sunderlandwick, South Dalton, Bishop Burton and Walkington there are well-wooded estates, whilst in Holderness the woods of Wassand, Rise, Burton Constable and Winestead stand out in a comparatively treeless agricultural district. In the woods on the western edge of the Wolds, the Green Woodpecker and Great Spotted Woodpecker still flourish, and there is at least one record of the Lesser Spotted Woodpecker remaining to breed. The Jay also is fairly plentiful, but unknown on the eastern

side of the Wolds. The rest of the corvidæ are too numerous, and require reducing. A rare occasional



LESSER SPOTTED WOODPECKER TAKING FOOD
TO ITS YOUNG.

breeder is the Woodcock, which has not been found breeding in the woods near the coast.

Among the smaller birds, the Wood Warbler is a scarce but regular visitor. It has only been known to

breed once in Holderness. The Chiffchaff is rather more numerous; but a scarce bird. The Grasshopper Warbler—the rarest of all our warblers—appears now and again in Holderness, and may sing for a month, but does not appear to find a mate, and has not been known to breed east of the Wolds. To the west it breeds occasionally.

The Goldcrest, formerly abundant in all our fir-woods, was completely wiped out in the winter of 1915-1916, and has not completely recovered yet. The Hawfinch is not uncommon, but its numbers vary from year to year. In some years it has been plentiful near Beverley and Burton Constable, but has almost disappeared from the latter place. The Goldfinch, in pre-war years very scarce, has increased wonderfully since 1914, partly owing to the suppression of the professional bird-catcher, partly to the increase of weeds during the war. The Tree Pipit is most unaccountably scarce, especially in contrast to the West Riding. Of the Tits, the rarest is the Long-tailed, more visible in winter than spring. It breeds sparingly in some of our wooded estates. The Nightingale is an occasional summer visitor, attracting numerous visitors by its song. Of the Owls, the Barn Owl would be common if it were not shot so frequently by farmers. In the Vole year, 1914, the birds increased enormously, apparently coming in from other quarters to the East Riding, and producing clutches up to seven eggs, but in the autumn of the same year I heard of forty being shot in North Holderness by farmers, who have always been the chief offenders in destroying this bird.

The Little Owl appeared in the Riding in 1911 as a breeding species, and unfortunately has been spreading and increasing ever since.

The accipiters are represented by Sparrow Hawk and Kestrel only. The Turtle Dove has been increasing and extending its breeding range since 1907, and is now quite numerous on the Wolds. The commoner woodland birds are well represented, but do not call for special comment.

The glories of Holderness lie in the past rather than the present. A series of old lake-beds and buried tree roots testify to the original character of the land, once covered with swamp, lake and forest. An interesting discovery of bones of birds and animals was made in the old bed of Skipsea Mere in 1914, particulars of which have been recorded in *The Naturalist* for 1922. They include the following: White-tailed Eagle, Cormorant, Jay, Goldeneye, fragments of Swan's egg, Mallard and Kite, *milvus ictinuo savigny* the only record for England.

The avifauna of the district, therefore, does not seem to have changed, all these species occurring as breeding or migrant visitors, with the exception of the last named. Of these once numerous lakes, only Hornsea Mere remains. The birds here have been protected by the Yorkshire Naturalists' Union Bird Protection Committee since 1910, with the kind permission of the owners, the Strickland Constables, of Wassand. Here a flourishing Heronry of thirty to forty nests exists. John Taylor, the late keeper at Wassand, tells how the first nest appeared thirty years ago, and how he protected the birds and watched the Heronry grow to its present size. A fair breeding stock of Pochards has always existed. About 1910 the Tufted Duck commenced to breed, and steadily increased till the severe winter of 1915-1916 almost wiped the bird out. Since then the numbers have

slowly recovered, until at the present they outnumber any other duck as a breeding species. A few Mallard and Teal nest here, and the Shoveller in varying numbers. In dry years they are not always present. In 1921 two pairs of Gadwall were on the Mere in the breeding season, but were not observed to nest. The Water Rail is a regular breeder, and the Spotted Crake has been heard during June on the edge of the Mere.

The Great Crested Grebes were reduced to three pairs in 1900-1913 by the depredations of egg collectors, but by careful protection have increased greatly. In 1911 eight Bearded Tits were turned down by Mr. W. H. St. Quintin, but though they became acclimatised to their surroundings and flourished for eight or nine years, it is to be feared that they disappeared in the winter of 1921-1922.

For the rest, Moor-Hen, Coot, Reed Warbler, Sedge Warbler and Reed Bunting abound. In the autumn, the breeding species of Duck migrate, and their places are taken by vast numbers of immigrants. Amongst these are the Whooper Swan and other visitors to their former breeding haunts, e.g., Bittern and Marsh Harrier. The list of winter migrants is too numerous to specify.

The rest of Holderness and Howdenshire is a more or less open agricultural district with scattered spinneys and hedgerows, a special feature being the large open drains which carry off the water from the low lying land. The avifauna consists chiefly of Linnet, Corn Bunting, Yellow Hammer, Skylark, Meadow Pipit and Whitethroat, whilst the Yellow Wagtail, though nowhere abundant, is well distributed. The Common Partridge occurs in varying numbers, generally very

patchy on the heavy clays, where disease usually attacks the young broods. Of disappearing species we have to regret the Corncrake, once numerous, but now rarely heard, and Whinchat, confined to the few uncultivated areas, generally on the banks of our agricultural drains. The reason for this decrease, as far as careful records enable us to judge, lies in the introduction of machinery and earlier cutting of the grass. The Stonechat occasionally breeds on the coast



GREAT BUSTARD ♂ ♀ KILLED AT MALTON 1825.

A most unwelcome reappearance and increase of the Magpie has taken place in South Holderness since 1914, and the Crow is very partial to our clay land.

Between these stretches of once marsh and now agricultural land lies the series of undulating chalk hills known as the Yorkshire Wolds, the highest point of which, Garraby Top, is 808 feet above sea level. The character of these has changed as much as that of the lowlands, and is due in great measure to a seemingly irrelevant cause, the introduction of the turnip about the middle of the seventeenth century, which

permitted of a regular rotation of crops, and provided food for the sheep upon which this rotation largely depends. Formerly the Wolds consisted to a great extent of unenclosed sheep walks and warrens, furze and heather covered hills, and cultivation was to a great extent confined to the valleys. In 1772, Sir Tatton Sykes commenced the cultivation and enclosure of the Wolds in earnest, encouraged by the high prices of agricultural produce. The movement reached its culminating point in 1795-1814, at the period of famine prices following the French Revolution, and the last of the warrens, viz., at Cold Wold, on the Warter Estate, was ploughed up about 1904. The Great Bustard, which, as we have seen, was used regularly at the tables of the rich in 1512, disappeared about 1835, the victims of the gun. The Stone Curlew, once plentiful all over the Wolds and the warrens of Howdenshire, seems doomed to share its fate. Its breeding range in the seventies extended to Cliff Common, where Mr. F. Boyes and Mr. John Reynolds can remember 6 or 7 pairs breeding. Previous to that it was fairly numerous on Tollingham Warren, near Holme. As these warrens were ploughed up, the bird was driven back on the Wolds, where it now leads a precarious existence, a few pair still surviving on the highest and bleakest land, and in plantations which cover its old breeding ground. The Wold Country is for the most part bare agricultural land, with a few well-wooded estates as at Sledmere, Warter, Hotham, South Dalton and Etton. The open land has a sparse bird population, consisting mainly of Peewit, in sadly diminished numbers, Linnet, Yellow Hammer, Skylark, and Whitethroat. The Brown Owl has almost ousted the Long-eared Owl, once the common species. The

Stock Dove, which used to breed in rabbit holes prior to the enclosure of the Wolds, is fairly numerous, choosing hollow trees and even open nests for nidifications. Occasionally the Wheatear is found in the valleys. The Quail still breeds occasionally round the



STONE CURLEW ON NEST.

western and northern edge of the wolds. The Partridge finds a more congenial breeding ground here than anywhere else in Yorkshire. During the phenomenal immigration of the Sand Grouse in 1888, 2 pair of eggs, the only authentic British-taken ones were found, one at Newbald Lodge, and the other at High Gardam.

In the streams which rise on the east and west edges of the Wolds, the Dipper nests occasionally, and in

1913 a pair of Grey Wagtails frequented the Driffield Beck all the spring and early summer. In the winter the Wolds are frequented by thousands of Pink-footed Geese, which arrive almost to a day on 24th September. They spend the night on the Humber, and at daybreak flight over Hull, Beverley, Ferriby, and Brough to the stubble fields, where they feed till dusk, flighting back to the Humber for safety at night. The Dotterel is seen also on the spring and autumn migration, and it is to be feared that the constant shooting of the bird on migration has seriously diminished the numbers breeding in North Britain.

At their north-east extremity the Wolds terminate abruptly in the sheer precipices of Speeton, Buckton, Bempton and Flambro', rising to a height of 435 feet at their western extremity, and sloping gradually down to about 150 feet at Selwick Bay, near the lighthouse. The cliffs are remarkable, not so much for their height, which is far exceeded at Boulby further north, as for the stern character of the precipice extending in one almost unbroken line to Thornwick Bay, and making them the most striking series on the east coast of Great Britain. From mid April onwards to the end of July they are covered by myriads of sea birds, which have been increasing ever since the Wild Birds Protection Act, 1880, stopped the senseless slaughter which went on in the name of sport during the breeding season. A serious danger has arisen of late years in the discharge of oil upon the waters, by which thousands of Razor Bills and Guillemots have been destroyed. The Razor Bill, Guillemot, Puffin, and Kittiwake are by far the most numerous of the breeding birds. The Raven disappeared some time in the forties, and the old breeding place, called Ravens Shelf, has gone into the sea.

The Peregrine Falcon bred till 1879, but was exterminated by shooting the old birds and taking the young. In 1910 it returned, and bred regularly till 1919. Since then it has not nested, owing in all probability to blasting operations on wrecked vessels. Of other breeding birds, the Rock Dove and Herring Gull are



GUILLEMOTS ON HATELY SHOOT.

most conspicuous, the increase of the latter in recent years being unfortunate, as it destroys all the eggs and young of other birds that it can get at. To appreciate the beauties of our cliffs, a visit should be paid on a sunny day in June, when the whole cliff face is alive with birds, and the cliff climbers, the most accomplished in the British Isles, are following their occupation.

The spectacle of the climbing draws crowds of visitors, and the extraordinary variety of coloration of the Guillemots eggs attracts collectors from afar. No such



THE "CLIMBER" ON BIRLING GAP, BRITON.

colours are obtainable from other parts of Great Britain. A notable addition to the breeding birds has been made this year, when 5 pairs of Fulmar Petrels have actually bred, and the presence of many more birds gives promise of a great increase in years to come.

The Spurn peninsula has a most interesting population of breeding birds, though the number of species is limited. The Ringed Plover and Little Tern form the bulk, but there are also Linnets, Yellow Hammers, Reed Buntings, numerous Skylarks and Meadow Pipits, a few Whitethroats, Song Thrushes, Blackbirds, an odd pair of Wheatears; very rarely the Stonechat; A few pairs of Sheld-Duck, Redshank, Lapwing; in 1921 two pairs of Common Tern, and occasionally a pair of Oyster Catchers. Previous to 1906, when the Yorkshire 'Naturalists' Union Protection Committee appointed a paid watcher to protect the birds, the numbers had been much reduced by the depredations of egg collectors and dealers, but they increased steadily until 1915, when the Spurn area became a great military camp. In 1916-1918, no watcher was allowed, and the numbers were reduced to about one-third of pre-war strength. They have now returned to pre-war numbers.

The Flamboro' headland, standing further out to sea than the coast to the north, and Spurn promontory, overlapping the Lincolnshire coast, are specially favourably situated for attracting migrant birds, and, in addition to this, the extensive stretches of mudflats inside Spurn offer abundant supplies of food, especially to the waders. Herr. Gätke observed that migrants passing over Heligoland in the autumn do so in a direction due east and west. Flamboro', being on the same parallel of latitude as Heligoland, is the most natural objective for this migration. The prominence of this stretch of coast also catches the stream of migrants who land to the south and make their way along the coast northward, or *vice versa*, in autumn, retracing their steps in spring. The autumn migrants

from Northern Europe commence arriving in July and go on till November, and there are often two streams of migration crossing each other, one passing north and the other south. If the wind is contrary, and the birds are exhausted, they settle on the coast to rest.



HAWFINCH.

but in favourable winds, pass on to their destination. The list of these birds includes all the migrants from the North of Europe, as well as rare stragglers from districts outside the usual migration routes.

From the first Curlew arriving on the Humber mudflats early in July to the last Turnstone and Dunlin leaving for the north early in June there is a

constant movement of birds coming and going. In October the Spurn sandhills are sometimes covered with Goldcrests, whilst on the mudflats in the same month, Dunlin, Little Stint, Pygmy Curlew, Knot, Ruff, Sanderling Common Sandpiper, Greenshank, Bar-tailed and Black-tailed Godwit may be observed. In the ditches of the adjoining land the Green Sandpiper rests and feeds. All the North European Geese and Ducks have been recorded in the Spurn to Flamboro' area, and such rare stragglers from the recognised migration routes as the Glossy Ibis, Little Bustard, Macqueen's Bustard, White-winged Black Tern, Pectoral Sandpiper Western Mediterranean Shearwater and others. Spurn is especially famous for the migration of the Woodcock, which, when exhausted by contrary winds, drop down on the promontory and adjacent land in great numbers. On a migration night, 1100 birds have been recorded as killed on the lantern of the Lighthouse, most of them being Starlings. To prevent this destruction of bird life, Mr. St. Quintin generously provided bird perches before the war, but during the war the lantern was not used, and they have only been erected during one winter since 1918.

In Hull, we have had some notable migrations, when, on a foggy November night, the air has been filled with waders flying to and fro above the tops of the houses and making sleep impossible by their cries, and in Beverley flocks of Pink-footed Geese have been lost in the fog and descended in the public streets.

FISHES OF EAST YORKSHIRE

By CHAS. F. PROCTER

THE fish of the district are of a varied and cosmopolitan character. The sea, the estuary, tidal rivers, non-tidal pastoral streams, sluggish streams, chalk streams and becks, sluggish drains from clays, fresh water ponds and brackish ponds are all present in the area. The result of this combination is that exceedingly few of the fish on the British list are absent. An exception must be made, perhaps, for some of the less distributed species of Salmonidae, but the lack of a mountain tarn is chiefly responsible for this. We have no Char, nor does the Sea-trout occur; whilst local forms, which are a feature in some parts of Britain, are not here sufficiently distinct to be classified even as varieties. The general love of angling which characterises the East Yorkshire inhabitants is probably at one and the same time both the effect and the cause of some of this plenty; at least as far as "coarse" and "game" fish are concerned, since most of the available angling water is highly protected and artificially stocked from time to time. The incursion of fresh blood thus brought about has more far-reaching results than the immediate numerical addition to the head, which the water carries.

The order ACANTHOPTERYGII is represented by the Common Perch, which abounds in all the streams and ponds. In Hornsea Mere and Burton Constable Lake it attains a large size.

The Pope, or Ruffe, locally known as "Johnny Ruff," and a near cousin to the Perch, is common in the streams.

The three-spined Stickleback and the ten-spined Stickleback are both common, the former preponderating. The ten-spined Stickleback is much more common than in most districts, and is quite at home in the brackish waters of the estuary. It can be at any time taken in the pools left by the tide along the foreshores and salttings. This applies also to the three-spined, but in a less degree.

The "Miller's Thumb," or "Bull Head"—our only member of the family COTTIDÆ is common in the becks and streams about the foot of the Wolds.

The claim to include the order ANACANTHINI rests on the sporadic occurrence of the Burbot Eel or Eel Pout in the River Hull and the Humber, but it is now much more rare than it was thirty years ago (it is only found in the East Coast rivers) : and the Flounder, which is common in the ponds which have access to the estuary. It also ascends the river as far as it is tidal. It is really a marine fish, since it has to descend to the sea to spawn.

The Order PHYSOSTOMI includes the families CLUPEIDÆ, ESOCIDÆ, SALMONIDÆ and CYPRINIDÆ, all of which are represented.

CLUPEIDÆ is very slenderly included, as it rests on the occurrence of Allis Shad, which has been once recorded for the Humber. It probably occurs regularly, but is not a sporting fish, and only ascends the rivers at certain times for a short stay.

The Pike is a very able spokesman for the ESOCIDÆ, and we have a great reputation throughout the country for our fine Pike, Hornsea Mere especially upholding

this. There has probably been more "specimen" fish of round about 25 lbs. taken within 25 miles radius of Hull from streams and lakes, than in any similar stretch of country in England.

As to the SALMONIDÆ, the lordly and aristocratic Salmon was once sufficiently plentiful at the time of the autumn run, to maintain a profitable netting fishery in the Humber, but its glory is now departed. This is much to be regretted, although a number yet ascend the Ouse and Derwent *via* the estuary. It is extraordinary that we are ignorant of where the Salmon spends his time, when he returns to the sea to fatten up and recuperate after spawning.

The Brown Trout is common in the chalk streams, as is also the Grayling, both of which grow fat and lusty. The latter is very prone to become a nuisance in a situation with nice gravelly runs and deep pools as "The Queen of the Stream" is a most indefatigable seeker after the spawn of the Trout, and more than holds her own under such circumstances.

The Smelt is common during the fall of the year in tidal waters, and can be taken to bait in considerable numbers.

The Eel need but be mentioned, as it is everywhere. Though anglers usually discriminate between the blunt-nosed and sharp nosed specimens, there is but one species, and difference of shape and coloration are merely due to age, sex and environment.

The family CYPRINIDÆ covers practically the whole of the remaining fresh water fishes, and provides the mainstay of the itinerant angler's sport.

First in importance is the Roach, which occurs, not only in all the local streams and drains, but finds the situation of some of our lakes so much to its liking

that as many as twenty have been taken at a sitting, each of which exceeded the weight of what for years stood as the record for fair angling.

The Rudd occurs in several ponds and lakes, but is not general. It is by no means easy to distinguish this fish from his near relation, the Roach, but he grows to a heavier size. This has many times been responsible for much heart burning among record-breakers in the angling world. He is so nearly related to the Roach that they will hybridise. This also applies to the Bream.

The Dace, Gudgeon, Chub, Common Bream, Minnow, Tench, Barbel, Carp are all common, with the exception of the two latter.

The Bleak, although common enough in the upper reaches of the River Hull, is not by any means so plentiful as it generally is in the Yorkshire coarse-fishing rivers.

The Stone Loach is of very local occurrence in the chalk streams of the Driffield district.

The Sturgeon has from time to time ascended the Humber, and entered its tributary rivers, but is, of course, a straggler.

The MARSIPOBANCHII comprise the hag-fishes (a purely marine form), and the Lampreys. These latter are locally represented by the Sea Lamprey, which ascends the rivers at spawning time, and the fresh water Lamprey (or "Lampern" as it is often called), which in some seasons occurs in considerable numbers in the rivers. It is chiefly used as a bait for line fishing by North Sea fishermen. Planers' Lamprey probably occurs, as it is a very well distributed species, but there is no definite record for the district.

The rest of the local Piscatorial fauna might very

fairly be said to comprise the whole of the marine species of Britain. At one time or another the East Coast, from Spurn to Bridlington, has yielded practically specimens of all the fishes on the list, whilst most of them are very plentiful in their season, giving employment to a considerable fraternity of fishermen.

REPTILES AND AMPHIBIANS OF EAST YORKSHIRE

By CHAS. F. PROCTER

THE Reptiles and Amphibians of the area include the whole of the county list. The Viper is only a very occasional find on the commons to the Northwest, and never occurs in Holderness, or the land adjacent to the estuary. The Grass Snake, on the contrary, is not only commonly distributed, but in some parts of Holderness is plentiful. It is often taken of a good length ; and a little time ago my son took one while swimming in a stream near the city, which was 4 feet long when extended. Of late years, this snake has undoubtedly increased in numbers, and appears to be extending its distribution along the numerous agricultural drains which intersect the low country. On the Wolds it is not by any means so common. A favourite sanctuary and centre of dispersal appears to be Kelsey Hill (where is a considerable excavation), in Holderness.

The Lizards are represented by the Slow-Worm or Blind Worm, which occurs very sparingly in East Yorkshire, but is more common in the Western and South Western boundaries of the area. My own experience in Holderness is confined to one instance only, at Ottringham in 1919. It is, however, common in certain places, round Market Weighton, Melbourne, Allerthorpe and Barmby Moor.

The Viviparous Lizard may be found on any sunny day at numerous places round the estuary, especially to the East and at Spurn Point. It is established amongst the chalk boulders, of which the retaining banks are built, and seems to prefer the line where the flotsam and jetsam of high water is to be found. It is not met with inland again until the higher wold country is reached, and is there confined to the waste lands. That the Snakes were at some time, not far past, much more common is indicated by some of the local place names—Snake Hall Common being a good example.

The Sand Lizard has been frequently reported to me, but I have never seen a local specimen, and do not believe it occurs. The Spurn is an ideal habitat for it, and I have taken lizards there that I have been in doubt about. The large size and variability of colour of these are at times misleading, and I once kept a very fine one alive that seemed to be identical with the Sand Lizard. It, however, proved its identity and explained its size by giving birth to eight young ones. A dead specimen is easily determined by the presence or otherwise of the palatal teeth with which the true Sand Lizard is furnished.

The Newts are all found in the district, the Great Crested and the Smooth Newt being more than common.

The Great Crested Newt seems to thrive in some of the brackish ponds of the Spurn Peninsula to an unusual extent, and I have seen spring specimens larger here than anywhere.

The Palmated Newt used to be quite common, but for some obscure reason seems to be losing ground. In the early days of the war some disused ditches in

the rear of my house were full of them. The allotment fever was responsible for their extinction, but that does not explain why remote little ponds which used to always yield specimens never do so now. It is three years ago since I saw a Palmated Newt in the district.

The Common Toad and the Common Frog are ubiquitous; but I have no record or experience of either the Natterjack Toad or the Edible Frog.

MARINE MOLLUSCA OF YORKSHIRE

By J. IRVING, M.D.

THREE or four generations ago, before the British Association for the Advancement of Science came into being, a list of Yorkshire molluscan records was started which possibly needs revision in regard to the qualification *Yorkshire*. The incorporation of specimens trawled either in the neighbourhood of the Dogger Bank (sixty miles off the coast), or in forty fathoms, thirty miles off Whitby, or at a distance of eighty-five miles north-east by east of Scarborough, gives the impression that pioneer Yorkshire conchologists acted upon the assumption that the North Sea belonged to the County of York. If a shell, dead or alive, is secured at a depth of forty fathoms, *thirty miles off Whitby*, is it a *Yorkshire Shell*? If a balk of *Danish* timber, bored by some form of *teredo*, floats into the harbour at Scarborough, is the *teredo* discovered therein a *Yorkshire* species? Greater scientific accuracy would obtain if the hunting range for molluscs were confined to a three-mile extension seawards of the coast-line, and a map of Yorkshire, to be perfect, ought to show this subaqueous area within which marine organisms might be rightly designated "Yorkshire." It is not at all improbable that specimens, hitherto attributed to the Dogger Bank, or to indefinite spots in the North Sea, could be procured in this restricted region by exploring it systematically in sections.

Such entries as "single valve, Dogger Bank," "imperfect valve, off Scarborough," and the ambiguous "brought in by trawlers," hardly justify the recording of species, and should be expunged.

Concentration upon a few judiciously selected sections, beyond low-tide level, of this three-mile coastal area, should result in confirmation, or otherwise, of existing records, with the possibility of valuable additions. For this purpose, by way of example, Carnelian Bay, Filey and Redcar might be chosen, where, owing to geological differences and consequent variations in *flora*, deficiencies of *fauna* in one section might be made good in another. An average breadth of a mile, with a run out to sea of three miles from each of these centres would embrace nine square miles of sea-covered territory, which, if thoroughly trawled and dredged, should enhance the scientific value of "finds," and eliminate to a large extent the haphazard methods of the past. Several years' experience of these proposed sections, sometimes under trying circumstances at very low tide, encourages the belief that no other sections of the Yorkshire Coast are richer in species, and that forms found elsewhere will be in evidence in one or other of them if carefully overhauled.

The Scarborough Philosophical Society, in 1855, erected a tank in the Museum for the exhibition of living sea organisms. To supply additional occupants for this tank, a cobble (costing £7) was provided which was used for dredging and other purposes. The tank was in operation twenty years, but the cobble was sold at the end of three years for a couple of sovereigns. Presumably some of the indefinite records found in Yorkshire lists of mollusca occurred through the employment of this cobble.

Conchologists will find a fairly representative set of Yorkshire marine shells in the Hull Museum. It was arranged by the late Rev. F. H. Woods, B.D., whose chatty notes upon "The Mollusca of the Yorkshire Coast," deal pre-eminently with the Hull Museum specimens. These notes were published in the *Transactions of the Hull Scientific and Field Naturalists' Club*, Vol. IV., Part V.; they were reprinted later and issued as one of the *Hull Museum Publications* (No. 91), to which reference should be made for details.

A list of families and species of Yorkshire Marine Mollusca accompanies this chapter, but for varieties, dates, names of recorders, and localities, the interested reader should consult the more elaborate list, culled from all available sources, by Mr. J. A. Hargreaves, of Scarborough, an enthusiastic collector of shells, and investigator of shell sand. This list was published in the *Journal of Conchology*, Vol. XIII., July and October, 1910, under the title of "The Mollusca of the Yorkshire Coast and the Dogger Bank"; it was afterwards issued as a Reprint. In it will be found valuable references and personal notes.

Putting out of account both trawl and dredge, which are not always accessible to the ordinary worker, a successful search for molluses between tide levels seems to demand a little more knowledge than exact descriptive outlines of named shells. Food supply is all important. If diet suitable for a certain molluse be absent in a prospective area it will be vain to look for it there. Text-book information on this subject is too scanty, and sometimes if, and when, given, too unreliable. Habitats are often determined by the abundance of available nutriment, vegetable or animal, in conjunction with conditions which make for peaceful

occupation. Character of food required may be inferred from examination of tooth-ribbons. Microscopical illustrations of odontophores, whenever possible, should be placed alongside drawings of tooth-bearing molluscs to indicate their capacity to deal with soft or hard vegetable material, or to perforate shells as a preliminary operation for the extraction of animal food. The wonderful diversity of these tooth-ribbons and the rôle they play in the life of their possessors are not generally understood or appreciated. A comparison of the simple ribbon of *Gibbula cineraria* with the complex saw-edge central triangular, and lateral scythe-like teeth of *Calliostoma zizyphinum* clearly shows why the former is not found associated with the latter, though both are vegetable feeders and, by classification, belong to the same family. By contrast with these should be studied the fine drilling organ of *Purpura lapillus*, and the stouter, stronger tooth-apparatus of *Buccinum undatum*, both carnivorous animals whose armature enables them to prey upon tightly closed bivalves. Other kinds of radulæ are found among nudibranchs. Certain dorids depend on sponges for their sustenance and the odontophore of the well-known *Archidoris tuberculata* has no difficulty in tearing up and rasping a sponge, however spiculous it may be.

In considering the habitats of bivalves, especially on the Yorkshire coast, geological formations should be taken into account. Mud, sand, and shell-sand vary in situation according to the geology of the cliffs, and differing types of bivalves favour differing localities which are known to experts. Razor shells and other bivalves, common at Filey, are rare at Scarborough. Rocks themselves have indwellers who apparently do

not select their particular niche at random. Thus we find *Saxicava rugosa* seems to prefer hard limestone, even in its most crystalline form, into which it penetrates in incredible numbers. *Barnca candida* chooses a soft bluish clay-stone in North Bay, Scarborough, and a precisely similar clay in Cornelian Bay, out of which it can easily be taken at any low tide. *Zirphaca crispata* is more ubiquitous and enters the softer sand-stone at Filey and Scarborough, the grey lime-tone at Scarborough, the lias at Whitby and Robin Hood's Bay, and the chalk at Flamborough; it is abundant in these rocks, and can be procured in all stages of growth at low tide.

For satisfactory work at low tide levels, Cornelian Bay, Robin Hood's Bay, and Filey Bay with its Brig, are excellent. The distant rocks at Redcar are only approachable at extreme low water. Perhaps the region most attractive, on account of its flora, fauna, and rock variation, is that of Cornelian Bay, but, in order to negotiate its pools and islets, long rubber boots and a boat, if obtainable, are advisable. Here *Plano-branchus plumulus* occurs on boulders in the deeper pools; *Calliostoma tizzypnum*, rare elsewhere, is obtainable on distant islets; *Saxicava rugosa* exists in limestone; *Barnca candida* in soft clay-stone; *Zirphaca crispata* in shale; and numerous nudibranchs feed on *Tubularia indivisa* and other zoophytes. *Aplysia punctata*, which appears to be migratory in its habits, was abundant everywhere the year before war broke out, almost crowding the shallower pools at Filey, Cornelian Bay, both Bays at Scarborough, and Robin Hood's Bay. It deposited innumerable coils of eggs on low brown weeds, then disappeared, and has not been seen since in any of these breeding haunts.

Yorkshire pools are rich in nudibranchs. Wherever there are spiculous sponges, such as the Crumb of Bread Sponge, *Archidoris tuberculata*, *Jorunna johnstoni*, *Lamellidoris sparsa* and other dorids will be seen. On stones covered by barnacles and sertularians, *Lamellidoris bilamellata* is not uncommon. This well-marked dorid found its way into the Scarborough Bathing-pool in the spring of 1920, where more than three dozen specimens were discovered, which were at least three times as large as those usually got on stones in pools, and were actively engaged in spinning ribbons of eggs. Brightly coloured æolids, quite in harmony with their surroundings, occur on the under surfaces of rocks where tubularians luxuriate. Some nudibranchs affect *Alcyonium digitatum*, others *Alcyonidium gelatinosum*, or hydrozoa, such as *Obelia geniculata*. *Goniodoris nodosa* may be seen gliding on the so-called Irish Moss; *Limapontia nigra* lodges on the green Cladophora, and *Doto coronata* is sometimes to be caught on the broad blades of Ulva.

As with shell-bearers, so with nudibranchs, each species seeks its own special diet, for which it is provided with a distinctive radula, and a knowledge of its food and food locality should help the searcher to find it. Attention should be paid by Collectors of Molluscs to periods of reproduction when forms, difficult to secure at other seasons, find their way into accessible pools within tidal limits.

It is much to be desired that printed lists of records should be supplemented, if possible, by short notes on food, times of breeding, characters of egg-clusters, ribbons or coils, while illustrated text-books might be made more serviceable by the addition of dentification odontophotes, from micro-photographs

or drawings, pertaining to gasteropods and nudibranchs, and by the insertion of more detailed information concerning food supply and reproductive processes.

CHITONIDÆ.

- Lepidopleurus cancellatus.*
- Hanley hanleyi.*
- Tonicella marmorea.*
- T. ruber.*
- Callochiton lævis.*
- Craspedochilus onyx.*
- C. cinereus.*
- Acanthochites fascicularis.*

NUCULIDÆ.

- Nucula nucleus.*
- N. nitida.*
- Nuculana minuta.*
- N. tenuis.*

ANOMIIDÆ.

- Anomia ephippium.*
- A. patelliformis.*

ARCIDÆ.

- Glycymeris glycymeris.*
- Barbatia lactea.*
- Arca tetragona.*
- A. nodulosa.*

MYTILIDÆ.

- Mytilus edulis.*
- Volsella modiolus.*
- V. barbata.*
- Modiolaria marmorata.*
- M. discors.*
- M. discripans.*

OSTREIDÆ.

- Ostrea edulis.*

PECTINIDÆ.

- Pecten maximus.*
- P. pusio.*
- P. varius.*
- P. opercularis.*
- P. tigerinus.*

KELLIELLIDÆ.

- Lintoma minuta.*

ASIARTIDÆ.

- Astarte compressa.*
- A. sulcata.*
- Goodallia triangularis.*

CAPRINIDÆ.

- Cyprina islandica.*

LUCINIDÆ.

- Loripes lacteus.*
- Lucina borealis.*
- Montacuta substriata.*
- M. bidentata.*
- Tellimya ferruginosa.*

LEPTONIDÆ.

- Kellia suborbicularis.*
- Lasaea rubra.*
- Lepton nitidum.*

SCROBICULARIIDÆ.

- Syndosmya prismatica.*
- S. nitida.*
- S. alba.*
- S. tenuis.*
- Scrobicularia plana.*

TELLINIDÆ.

- Tellina crassa.*
- T. pusilla.*
- T. tenuis.*
- T. fabula.*
- Macoma balthica.*

DONACIDÆ.

- Donax vittatus.*

MACRIDÆ.

- Mactra stultorum.*
- Spisula solida.*
- S. elliptica.*
- S. subtruncata.*
- Lutraria elliptica.*

VENERIDÆ.

- Lucinopsis undata.*
- Dosinia exoleta.*
- D. lupina.*
- Venus fasciata.*
- V. casina.*
- V. verrucosa.*
- V. ovata.*
- V. gallina.*

TAPIDÆ.

- Tapes virginea.*
- T. pullastra.*
- T. decussata.*

CARDIIDÆ.

- Cardium aculeatum.*
- C. echinatum.*

<i>C. exiguum.</i>	CYCLOSTREMATIDÆ.
<i>C. fasciatum.</i>	<i>Delphinoidea nitens.</i>
<i>C. nodosum.</i>	<i>D. serpuloides.</i>
<i>C. edule.</i>	LITTORINIDÆ.
<i>C. norvegicum.</i>	<i>Lacuna crassior.</i>
GARIDÆ.	<i>L. divaricata.</i>
<i>Gari ferroensis.</i>	<i>L. parva.</i>
<i>G. tellinella.</i>	<i>L. pallidula.</i>
<i>G. depressa.</i>	<i>Littorina obtusata.</i>
MYIDÆ.	<i>L. rufus.</i>
<i>Mya arenaria.</i>	<i>L. littorea.</i>
<i>M. truncata.</i>	<i>L. neritoides.</i>
<i>Sphenia binghami.</i>	RISSOIDÆ.
<i>Corbula gibba.</i>	<i>Rissoa parva.</i>
SOLENIDÆ.	<i>Alvania punctura.</i>
<i>Cultellus pellucidus.</i>	<i>Manzonia costata.</i>
<i>Ensis ensis.</i>	<i>Onoba striata.</i>
<i>E. siliqua.</i>	<i>Hyala vitrea.</i>
SAXICAVIDÆ.	<i>Setia obtusa.</i>
<i>Saxicava rugosa.</i>	<i>Cingula semistriata.</i>
<i>S. arctica.</i>	<i>C. trifasciata.</i>
PHOLADIDÆ.	ASSIMINEIDÆ.
<i>Barnea candida.</i>	<i>Paludestrina stagnalis.</i>
<i>Zirphæa crispata.</i>	<i>Jeffreysia diaphana.</i>
TEREDINIDÆ.	ADEORBIDÆ.
<i>Teredo norvegica.</i>	<i>Adeorbis subcarinatus.</i>
ANATINIDÆ.	SKENEIDÆ.
<i>Cochlodesma prætenue.</i>	<i>Skenea planorbis.</i>
<i>Thracia fragilis.</i>	HOMALOGYRIDÆ.
<i>T. convexa.</i>	<i>Homalogryra atomus.</i>
DENTALIIDÆ.	CAPULIDÆ.
<i>Dentalium entalis.</i>	<i>Capulus hungaricus.</i>
PATELLIDÆ.	CYPRÆIDÆ.
<i>Patella vulgata.</i>	<i>Trivia europaea.</i>
<i>P. depressa.</i>	NATICIDÆ.
<i>Helcion pellucidum.</i>	<i>Natica pallida.</i>
ACMÆIDÆ.	<i>N. catena.</i>
<i>Acmaea testudinalis.</i>	<i>N. alderi.</i>
<i>A. virginea.</i>	<i>N. montagui.</i>
<i>Lepeta fulva.</i>	LAMELLARIIDÆ.
FISSURELLIDÆ.	<i>Lamellaria perspicua.</i>
<i>Emarginula fissura.</i>	<i>Velutina lævigata.</i>
TROCHIDÆ.	CERITHIIDÆ.
<i>Eumargarita helicina.</i>	<i>Bittium reticulatum.</i>
<i>Gibbula tumida.</i>	SCALIDÆ.
<i>G. cineraria.</i>	<i>Scala turtonis.</i>
<i>Calliostoma zizyphinum.</i>	<i>S. clathratula.</i>
<i>C. occidentale.</i>	<i>S. commutata.</i>
<i>C. montagui.</i>	<i>Cioniscus albidus.</i>
	<i>Aclis ascaris.</i>

PYRAMIDELLIDÆ.

- Odostomia acuta.*
O. unidentata.
O. turrita.
O. plicata.
Jordanella nivosa.
J. truncatula.
Brachystomia rissoides.

- B. ambiguus.*
Ondina obliqua.
Pyrgulina indistincta.
P. interstincta.
Spiralinella spiralis.
Turbanilla lactea.
Eulimella commutata.

- E. nitidissima.*

EULIMIDÆ.

- Eulima polita.*
E. incurva.
E. bilineata.

CACIDÆ.

- Cacum glabrum.*

TURRITELLIDÆ.

- Turritella communis.*

TRICHOTROPIDÆ.

- Trichotropis borealis.*

APORRHAIDÆ.

- Aporrhais pes-pelecani.*

BUCCINIDÆ.

- Buccinum undatum.*
Liomesus dalei.
Neptunea antiqua.
Volutopsis norvegicus.
Tritonofusus gracilis.

MURICIDÆ.

- Ocenebra crinacea.*
Trochon truncatus.
Purpura lapillus.

NASSIDÆ.

- Nassa reticulata.*
N. incrassata.

PLECTROTOMIDÆ.

- Bela turricula.*
B. tricelyana.
B. rufa.
Mangilia cestata.
M. umbula.
Clathurella linearis.

ACLEONIDÆ.

- Aclera tornatilis.*

TORNATINIDÆ.

- Tornatina truncatula.*
T. obtusa.
Diaphana hyalina.

SCAPHANDRIDÆ.

- Bullinella cylindracea.*
Volvulella acuminata.

PHILINIDÆ.

- Philine scabra.*
P. catena.
P. punctata.

LIMACINIDÆ.

- Limacina retroversa.*
L. balea.

APLYSIIDÆ.

- Aplysia punctata.*

PLEUROBRANCHIDÆ.

- Pleurobranchus plumulus.*

TRITONIIDÆ.

- Tritonia hombergi.*
T. lineata.
T. plebeia.

DORIDIDÆ.

- Archidoris tuberculata.*
Jorunna johnstoni.
Cadlina repanda.
Triopa clavigera.
Polycera quadrilineata.
Palio lessonii.
P. ocellata.
Acanthodoris pilosa.
Adalaria proxime.
Lamellidoris aspera.
L. bilamellata.
L. depressa.
L. pusilla.
L. repanda.
L. sparsa.
Goniodoris nodosa.
G. castanea.
Ancula cristata.
Idaliella aspera.

DENDRONOTIDÆ.

- Dendronotus frondosus.*

SCYLLÆIDÆ.

- Scyllæa pelagica.*

JANIDÆ.

- Antiopea cristata.*

DOTHONIDÆ.

- Doto coronata.*
D. fragilis.

ÆOLIDIDÆ.

- Coryphella lineata*.
C. rufibranchialis.
C. gracilis.
Galvina exigua.
G. picta.
G. farrani.
Embletonia pulchra.
Tergipes despectus.
Facelina coronata.
F. drummondi.
Cuthona aurantiaca.
C. elegans.
Cratena olivacea.
Aeolidia papillosa.

ELYSIIDÆ.

- Elysia viridis*.

LIMAPONTIIDÆ.

- Limapontia nigra*.

LOLIGINIDÆ.

- Sthenoteuthis pteropus*.

Loligo forbesi.

L. media.

SEPIIDÆ.

- Sepia officinalis*.

SEPIOOLIDÆ.

- Sepiola atlantica*.

S. scandica.

Rossia macrosoma.

OCTOPODIDÆ.

- Polypus vulgaris*.

Moschites cirrosa.

EAST YORKSHIRE LAND AND FRESHWATER MOLLUSCA

By JNO. W. TAYLOR, M.Sc.

OUR first knowledge of the non-marine Mollusca of the East Riding dates from the seventeenth century, when Dr. Martin Lister published his great work, the "Historia Animalium Angliae," and, incidentally, alluded therein to certain localities in South-east Yorkshire, and although Captain Thomas Brown and others made references to this district, they added little original information.

The first list of the Mollusca found in the vicinity of York by Dr. S. W. North was written and issued before the importance of precision had become widely recognised, and consequently no localities were given, and its future value vitiated.

In more recent years more precise methods have come into use, and Mr. J. Darker Butterell, Mr. J. Beanland, Rev. E. P. Blackburn, Mr. R. Miller Christy, Dr. J. S. Gibbons, Rev. W. C. Hey, Mr. W. Nelson, Mr. T. Petch and others have largely contributed, by their original observations and excellent local lists, to our present knowledge of the East Riding fauna.

Mr. Butterell and Mr. Petch are especially to be congratulated on their activity and success in their investigations, the former having exhaustively studied the molluscan fauna of Beverley, Hull and Hornsea,

in addition to making a very thorough investigation of the basin of the River Hull, while Mr. Petch, in addition to the observations and discoveries he has published from time to time, has also prepared an elaborate summary of all the available information on the Molluscan fauna of the East Riding, which has been published in the *Transactions of the Hull Scientific and Field Naturalists' Club*, and gives full distributional details for every species, with special maps illustrating the local distribution of the more interesting species. It is indeed a most excellent work, to which I am indebted for many facts and figures made use of in this report.

Mr. F. W. Fierke and Mr. J. W. Boult, who, from their long residence in Hull and their assiduous and prolonged investigation of the surrounding country, must possess an unique knowledge of its Mollusca, and it is hoped that they will publish at some early date the digested results of their experiences for the benefit of their fellow-workers.

The East Riding may be divided by its physical features into three well-defined areas—Holderness, the Chalk Wolds and Derwentland.

Holderness, which is formed chiefly of Boulder Clay, with numerous ponds and ditches, is rich in aquatic species; but their numbers are kept in check to some extent by the cleansing and thorough digging out to which all ditches and drains are periodically subjected.

The Chalk Wolds include the hilly country, and are formed of chalk, whose porosity precludes the formation of natural ponds, but the numerous dales, chalk pits and beech woods favour an abundance of land snails.

Derwentland is an alluvial plain, and almost ideal

for aquatic species, but it has not yet been exhaustively examined.

A census of the species inhabiting the combined areas show that 101 species are denizens, of which 45 are aquatic and 56 are land shells.

The eastern district or Holderness sustains 91 species, of which 44 are aquatic and 47 land shells, and 8 are peculiar and not yet found in the other divisions; these are *Testacella halistidea*, *Milax gagates*, *Vertigo minutissima*, *Balca perversa*, *Amphippelea glutinosa*, *Paludestrina jenkinsi*, *Pisidium milium* and *Pisidium obtusale*.



Testacella halistidea Drap.

The Chalk Wolds harbour 82 species, of which 52 are land and 30 aquatic species, while 7 are peculiar and restricted to this section; these are *Testacella scutulum*, *Limax cinereo-niger*, *Limax arborum*, *Hyalinia lucida*, *Lauria anglica*, *Clausilia laminata* and *Acme lineata*.

In Derwentland there are 70 species, of which 39 are land and 40 are aquatic snails, and only one species is restricted to this area, *Vivipara contecta*.

Genus TESTACELLA Cuvier.

The Testacellæ are subterranean and vermicorous, and in adaptation to the capture of living prey, the radula and its retractor muscles are enormously developed and the individual teeth acutely barbed.

Testacella haliotidea Drap. has been found by Mr. Butterell in Swaile's Nursery Gardens, Beverley.

Testacella scutulum Sowerby is not uncommon in gardens at Beverley, and Mr. Mason has found them at Woodleigh, Hessle.

Fam. LIMACIDÆ Gray.

This family of slugs is not a truly homogeneous one, as it still embraces genera which have acquired a superficial resemblance to each other in passing through similar stages of shell degeneration. The chief groups are *Limax*, *Lehmannia*, *Agriolimax* and *Milax*.

LIMAX still possesses the flat vestigial shell concealed within the mantle, but the viscera have lost the dextral twist, which can, however, still be traced in the decadent shell.

LEHMANNIA shows a great development of a coecal appendix to the rectum, which is one of the chief differences in organization to the typical Limaces.

AGRIOLIMAX demonstrates by its twisted viscera the verity of its descent from an ancestor with a coiled shell. This group differs also in the tentacular retractor being quite free from the sexual complex.

MILAX is characterized externally by an acute dorsal keel, and the bilobation of the mantle and their descent from ancestors bearing sinistral shells is shown by the twist of the viscera and of the vestigial shell.

Limax maximus L. is common throughout the East Riding. Its favourite resorts are cellars, outhouses and gardens. The varieties *fasciata*, *tigris*, *tetrazona*, *vinosa* and *cellaria* have been found at Beverley.

Limax cinereo-niger Wolf. is sporadically diffused in more or less montane and primitive woods or waste lands. The var. *maura* was found at Brantinghamthorpe.

Lehmannia flavus L. is a common species, especially in cellars, outhouses, etc., and is notable for the great development of the rectal appendix.

Lehmannia arborum B.C. in wet weather will ascend to the tops of the highest trees. It occurs at Sledmere, Howsham Woods and Kirkham Abbey.

Agriolimax agrestis L. is universally abundant and destructive in gardens. The vars. *nigra* and *brunnea* were found at Beverley.

Ariolimax laevis Mull. is remarkable for the cycle of development of the reproductive organs, which change with age from a primitive unisexual temmale condition, to the hermaphrodite state, and later become solely of male structure by the atrophy of the female organs. It is well distributed in damp woods and marshy places in Holderness and the Wolds.

Milax gigantes Drap. is recorded from the cliffs at Withernsea by Mr. Butterell.

Milax sowerbyi Fer. is as yet only known from the ravine at Filey and in gardens along the Beverley Road, Hull.

Fam. ZONITIDÆ Mörch.

The *Zonitidæ* are characterized by their thin, horny and glossy shells and their aculate marginal teeth, and although embracing genera of somewhat diverse phyla, is composed of species which bear a considerable external resemblance to each other, due to having undergone a similar degree of shell degeneration, which process will inevitably lead to the eventual assumption of an external similitude to the *Arieniidae* and *Limacidae*.

The British species are arranged as *Vitrina*, *Hyalinia*, *Polita*, *Vitreæ*, *Euconulus* and *Zonitides*.



VITRINA is based chiefly on the degree of deterioration the shell has undergone, but there are important differences in the structure of the animal. Our species is a *Phenacolimax*, *Vitrina fuliginea*, the shell being much reduced and partially enfolded by the greatly developed mantle-lobes.

HYALINIA Charp. is a natural group, viewed externally, but this resemblance is largely illusory and misleading. The *Euhyalinia* are typical of the genus, being glossy, compactly coiled shells, with large, but comparatively few radular teeth.

POLITA Held. comprises shells of a dull waxen aspect, and loosely coiled, and show many bodily differences.

VITREA Fitz. are tightly coiled shells of minute size and glassy whorls, and have their closest affinity with *Microcystis* and other genera of distant countries.

EUCONULUS Reinh. are minute multispiral shells; when

adolescent, they may, in primitive regions, possess calcareous lamellæ, similar to those of *Lauria anglica* and *cylindracea*, and, like them, are absorbed at maturity, they are probably reminiscent of apertural armature possessed by their ancestors.

ZONITOIDES Lehmann possess a well developed Stylophore and "Love-dart" and auxiliary external glands, quite homologous with those of *Ariophanta* a primitive group of South-east Asia.

Vitrina pellucida Müll. is a common species, and ranges over the East Riding. It is very indifferent to cold, and very active in winter, when it becomes adult.

Hyalinia (Euhyalinia) lucida Drap. is our largest species, and very near *H. cellaria*, differing in the deep slaty-blue colour of the whole animal, and in the marked enlargement of the last whorl of the shell.

It has been found at Tibthorpe by the Rev. E. P. Blackburn.

Hyalinia (Euhyalinia) cellaria Müll. is plentiful in the East Riding. It is a smaller shell than *H. lucida*, with fewer whorls, and a flatter spire, and the animal is pale grey. The nerve-ring shows a greater concentration of the ganglia, implying a greater efficiency of the sensorial faculties.

Mr. Mortimer has found specimens in "barrows" of "Bronze Age" at Birdsall Brow and Sledmere.

The var. *margaritacea* found at Meaux by Mr. Butterell.

Hyalinia (Euhyalinia) alliaria Miller is a common species in the East Riding. It differs from the preceding species by its smaller and darker shell, and is especially distinguished by the very strong smell of garlic it emits when disturbed. A doubtful specimen is recorded from a "barrow" at Birdsall Brow by Mr. Mortimer.

Hyalinia (Polita) nitidula Drap. differs from *Euhyalinia* by its dull horn-coloured and widely umbilicated shell, and by the absence of dorsal and lateral grooves on the body. It is a common species, and in the fossil state was found in Pleistocene marl at Bielsbeck by Mr. Sheppard.

Hyalinia (Polita) radiatula Alder is rare in the East Riding, and is a species sharply differentiated from others by the sharply defined transverse striation.

Hyalinia (Polita) pura Alder, differs from *H. nitidula* by its much smaller size and different sculpture. It is slow and lethargic, and has been considered as characteristic of elevated districts. It is rare in the East Riding, except on the Wolds.

The var. *margaritacea* is commoner than the type form.

Hyalinia (Vitreæ) crystallina Müll. is distinguished by the



Hyalinia lucida.

minute size, white colour and close coiling of its shell. It is somewhat subterranean in habit, and said to feed upon decaying leaves and other vegetable debris. It ranges over the whole East Riding.

Hyalinia (Euconulus) fulva Müll. is a conical, closely coiled shell of small size belonging to an ancient group which has overspread most of the world. It is a widely dispersed species and is common in the East Riding, and has been found fossil in the Pleistocene marl of Bielsbeck by Mr. Sheppard.

Hyalinia (Zonitoides) nitida Müll. is restricted to moist and marshy land. It is dispersed over the whole Holarctic realm, and is found in suitable places throughout the district.

Fam. ARIONIDÆ Gray.

The *Arionidæ* are slugs which have lost all external traces of the coiled shell they once possessed, and which is only represented by a few granules of soft calcareous matter concealed beneath the shield, but evidence of the former existence of a coiled external shell is discernible during embryonic life.

The most highly specialized forms as *Arion ater*, etc., are, however, now probably undergoing the initial stages of acquiring another shelly protective covering, as their thick and tough skin is now becoming so densely charged with lime particles as to render the animals very stiff and unwieldly in their movements.

Arion ater L., the "Black Slug," is generally distributed in the district. There are 15 chief varieties, the most interesting being the var. *albolateralis* Roebuck, which is black dorsally, with white side and orange foot-fringe, found at Hedon and Dane's Dyke by Mr. Petch.

Arion subfuscus Drap. was only recently discriminated in this country, there are 9 chief varieties, but the species only is recorded from Filey and Beverley.

Arion hortensis Fer. is too abundant everywhere, especially in gardens. The var. *subfusca* is recorded from Eccleshall and Pocklington by Mr. Roebuck.

Arion circumscriptus Johnston is well distributed in our area, the var. *neustriaca* was found near Pocklington by Mr. Roebuck.

Arion intermedius Normand is not uncommon amongst moss

and dead leaves in marshy places in the central and eastern districts of the East Riding. It is distinguished by the spiky dermal tubercles, from which the popular name of "Hedgehog Snail" has arisen.

Fam. ENDODONTIDÆ Pilsbry.

This is an ancient generalized group, intermediate between the *Zonitidæ* and *Helicidæ*, but decidedly less specialized than either. The Endodonts have also a wider geographical range than either of its two derivative sub-families, entirely covering Holarctica and the southern extremities of Africa, South America and Australia, as well as overspreading New Zealand and almost all the oceanic islands of the globe.

The *Endodontidæ* are divided into *Polyplacognatha* and *Haplogona*.

Sub-fam. POLYPLACOGNATHA Pilsbry.

This group is probably of vast antiquity, and a surviving remnant of a Palæozoic fauna, which in the far distant past overspread the world, but now only maintains a precarious position by its insignificant size. It is devisible into two genera, *Punctum*, which is exclusively Holarctic, and *Laoma*, which is the most ancient group, occupying New Zealand and Tasmania, and attaining a much larger size amongst the feeble fauna with which they dwell.

Punctum pygmæum Drap. belongs this decadent group, and is very unlike the *Helicidæ* in its dentition, composite mandible, and very minute size. It is well dispersed in Holderness and the Wolds, and Mr. Sheppard has recorded it from the Pleistocene marls of Bielsbeck associated with the bones of the Mammoth, Lion, etc.



Punctum pygmæum
Drap.

Sub-fam. HAPLOGONA Pilsbry.

This group is also composed of unspecialized primitive types, which, in course of ages, have become diffused over the whole earth, but which now only retain their ancient dominancy in the extreme southern extremities of the great continents, where they are still comparatively free from the competition of the more highly organized and more recently evolved Helicidian groups.

The *Haplogona* possess shells with simple unreflected lips and have simple genitalia with a mandible formed of overlapping and more or less completely fused laminae. The group is divided into two sections, one of which, *Pyramidula*, is represented in our fauna.

Genus PYRAMIDULA Fitzinger.

This group was formerly very widely spread, but is now largely supplanted in the temperate and tropical regions by more recently evolved types, and may be regarded as the scattered remnants of an early fauna.

*P. rotundata.*

Pyramidula rotundata Mull. is a comparatively small, common and widely distributed species in South east Yorkshire.

It has been found in a "barrow" of "Bronze Age" near Sledmere, by Mr. Mortimer. The var. *turtoni* has occurred at York and Hessle, and the var. *alba* at Hessle, and in Howsham Woods.

Fam. HELICIDÆ L.

Sub-fam. BELOGONA-SIPHONADENIA Pilsbry.

The true *Helices* are divided into several groups, of which the *Siphonadenia* is the latest evolved and most dominant, with well-developed and closely concentrated nervous centres. The few ancient species

of the earlier groups which still linger here are in a great measure protected by their insignificant size from the competition of the more highly organized and larger species.

The genus *HELIX* is typically *Pentatæniate*, although particular arrangements of the revolving banding may more or less characterize certain subsidiary groups or species. The sexual organs are well developed and not excessively specialized in any one direction, and the male and female organs are separated by the right-tentacular retractor.

HELICIGONA Risso. is characterized by the shell, usually showing only one peripheral band, but it is probable that it is really potentially pentatæniate. The long and thick spermathecal diverticulum, the dart sac with its stout, long and paired mucus glands, the lanceolate-headed dart and the basally twisted flagellum are all more or less characteristic features.

HYGROMIA Risso. are shade loving or woodland species, and differ from the typical Helices in the doubling of the stylophores, the love-darts and accessories, and in the wider separation from them of the vaginal mucus glands.

ASHFORDIA Taylor is of the simplest organization sexually, the stylophore, the love-darts and the mucus glands are all atrophied and lost, and the tentacular retractor is free from entanglement with the sexual organs, contrasting with the complex sexual organization of *Hygromia* with which the species of this genus was formerly closely associated on account of their close external convergence.

THEBA Risso. is also notable for the simplicity of the sexual organization, the vaginal mucus glands are present, but the darts are lost, and the stylophores are changing or have changed into sarcobela or fleshy excitatory organs.

XEROPHILA Held. are more or less restricted to dry and calcareous ground, and are separable from the typical Helices by the chalky whiteness of their shells and by the greater simplicity of their internal organization, as well as by the right tentacular retractor being quite free from the sexual complex.

Helix aspersa Müll. is a fairly large and dominant species,

and common in the East Riding. It has been widely distributed by commerce, and prospers amazingly, in some places becoming so abundant as to be a pest. In one small garden in Auckland, New Zealand, as I am informed by Dr. Longstaff, more than 12,000 specimens were destroyed in a single season.

The recorded varieties are *conoidea*, *minor*, *tenuior*, *ovalbida*, *unicolor*, *albifasciata*, *zonata* and *clathrata*, the var. *clathrata* found at Bridlington by Mr. Craven is the most interesting form.

Helix nemoralis L. is the most varied and tropically coloured of our species, and is very dominant and very responsive to its

environment, as was strikingly shown by a large collection made for me in 1882 by Dr. Eagle Clarke, at Spurn, a district with a very low rainfall, as I found the whole 5000 shells collected were with few exceptions, all pale yellow, with weak and feeble broken-up banding thereon, and therefore tending towards the uniformly pale or colourless shells characterizing sunny and arid regions.

Geologically it is recorded from the Pleistocene marl at Bielsbeck by Mr. Sheppard, and by Mr. Mortimer from "barrows" of "Bronze Age" at Birdsall Brow, Sledmere, Huggate, etc. The variations of this species are extraordinarily numerous, especially in regard to the banding of the shell, and Belgian specialists have declared that the number of possible band variations are 17,656.

The following varieties have been recorded from the district : *acuminata*, *minor*, *albina*, *libellula*, *ribella*, *peteria*, *studaria*, *olivacea*, *sextasciata*, *punctata*, *fasciata*, *latentia*, *mesozonata*, *citrinozonata*, *hyalozonata*, *limarginata*, *rescolabiata*, *albilabris*, *undulata* and *scalariforme*.

Helix hortensis Müll. is a close ally of *H. nemoralis*; so close indeed, that the only decisive distinction between them is in the difference between their gypsobela or "Love-darts"; those of *H. hortensis* closely resemble those of *H. pisana*, while that of *H. nemoralis* is a replica of that of *H. aspersa*.

It is locally distributed throughout the East Riding.

Though less variable than *H. nemoralis*, it presents some attractive modifications; they are *baudoni*, *lilacina*, *castanea*, *fuscolabris*, *rescolabiata*, *z-fasciata* and *scalaris*. Mr. Mortimer has found specimens in "barrows" of "Bronze Age" at Sledmere, Birdsall Brow and other places.

Helicigona (Arianta) arbustorum L. is the type of the section *Arianta*. It is a gregarious, geophilous, subdominant and very hardy species, and at extreme altitudes its active life is restricted to a few brief weeks in each year. In the East Riding, though usually rare, it is occasionally locally common. It has been found by Mr. Mortimer in "Bronze Age barrows" at Birdsall Brow, Sledmere, etc.



Helix nemoralis. L.

The local recorded varieties are *flavescens*, *fuscescens*, *cincta*, *fusca*, *major*, *conoidea*, *depressa* and *bifasciata*, the most interesting being var. *bifasciata*, found at Barlby, near Selby, by Mr. J. F. Musham.

Hygromia striolata C. Pfr., formerly known as *Helix rufescens*, is a shade-loving species, and is remarkable as possessing paired "Love-darts," each in its own stylophore with accessory sac. It is dispersed throughout the district, though only common about Flamborough. The known local variations are the vars. *alba* and *rubens*.

Hygromia hispida L. inhabits moist and shady places. When living in drier and more open situations, the shells become flatter, smoother and brighter, with a thinner and less hispid epidermis. It is dispersed over the whole district. In the Pleistocene it is recorded from the marl at Bielsbeck by Mr. Sheppard, and in the Holocene it is recorded by Mr. Petch from Hornsea, and found by Mr. Mortimer in a "barrow" of "Bronze Age" at Birdsall Brow.

The vars. *hispidosa*, *fusca*, *subrufa* and *albida* have been recorded.

Ashfordia granulata Alder is linked to *H. hispida* by external convergence only, as the reproductive system of the present species has lost all the accessory organs so fully developed in *Hygromia*, and demonstrates how diverse they really are, while the freedom of the tentacular retractor from entanglement with sexual organs accentuates the affinity with *Theba*.

It is a local species in the East Riding, but is known at Sledmere, Newholme and Howsham Woods.

Theba cantiana Mont. is a comparatively recent element of our fauna, and has a compact distribution not naturally extending beyond Yorkshire. Its local variations are *rubescens*, *albida*, *minor* and *albocincta*, of which the var. *albocincta* from Osgodby is the most interesting, as showing its origin from a primitively banded ancestor. It has been found fossil by Mr. Mortimer in a "barrow" of Bronze Age at Birdsall Brow.

Xerophila itala L. stands alone among the British species in possessing paired "Love-darts" within a single, though distally bifid, dart sac. It is a species usually plentiful on dry or calcareous ground, but is not confined thereto. It is very common in many parts of the Wolds and Holderness, and Mr. Mortimer has found it in the Holocene in a "barrow" of the Bronze Age at Sledmere.

The local varieties are *alba*, *minor* and *sinistrorum*.

Xerophila virgata Da Costa is a gregarious and common species in South-east Yorkshire, especially along the coast and on the Chalk Wolds. It swarms in the autumn, especially after rain, giving rise to the reports of "Showers of Snails." It is one of the species chiefly eaten by sheep, and contributes to give the South Down mutton its superior flavour.

The varieties known in the district are *ornata*, *carnata*, *albicans*, *lutescens*, *nigrescens*, *bilineata*, *maritima*, *hyalozonata* and *radiata*, the last being the most interesting form, and was found near Hunmanby by Mr. W. E. Brady.

Xerophila caperata Mont. is found more frequently inland than are its congeners, and is likewise fed upon by sheep. It is found commonly in Holderness and on the Wolds, but is much rarer in Derwentland.

The var. *ornata* is found in Holderness and on the Chalk Wolds.

Xerophila heripensis Mabille was formerly united to *caperata* as var. *gigaxii*, and although *X. caperata* and *X. heripensis* are undoubtedly closely allied, and outshoots of the same stem, yet they have now finally parted company, and the divergencies now existing will gradually increase.

This species is strongly attached to calcareous ground, and has been found in an old chalk pit at Willerby Wold, and also at Staxtown Brow by Mr. J. A. Hargreaves.

Sub-fam. ACANTHINULINÆ Steenberg.

This group comprises the genera *Acanthinula* and *Vallonia*, which have much in common in their sexual organization. It is a decadent group whose extinction has possibly been indefinitely retarded by their insignificant size and parthenogenetic tendencies.

Both genera are probably subject to a periodical or seasonal dimorphism, and the male organ may only be developed for a very limited period.

The *Acanthinulinæ* is retained tentatively in *Helicidae*, and forms a connecting link with the *Bulininidæ*.

Acanthinula aculeata Müll. is a minute mollusk whose shell is composed largely of organic matter, implying a life amongst moist and umbrageous surroundings. The complex organization of the intromittent organ shows its affinity with the *Bulininidæ*. It is a common species about Beverley, Sledmere and Hornsea.

Vallonia pulchella Müll. has a more extensive range than any other mollusk, and is even abundant on Mont St. Fernard, at an altitude of nearly 10,000 feet. It is naturally diffused over Holarctica, and widely spread through the Southern Hemisphere. It is generally distributed over the East Riding, and recorded by Mr. Sheppard from the Pliocene marl at

Bealsbeck, and it also occurs in Holocene deposits at Hornsea, Sewerby and Flamborough.

Vallonia costata Müll. is regarded as more primitive than *V. pulchella*, and differs in its shell sculpture and its simpler radular teeth. Its distribution is essentially similar to that of *V. pulchella*, and has been recorded usually from beneath stones in dry places at Skidby, Brough, Hornsea and other places.



V. costata × 8

Fam. BULIMINIDÆ.

This group is constituted by the genera *Ena*, *Pupilla*, *Lauria* and *Vertigo*, all of which are characterized by a brown or horn-coloured shell, indicating an inhabitant of moist or shady places. The group more or less generally has a complicated male side of the generative organs, which in the smaller species seems peculiarly liable to atrophy. All the species are somewhat arboreal, mural or rupicolous.

Ena obscura Müll. occurs throughout the district, though practically restricted to the Chalk Wolds. It is of arboreal or mural habit, and adopts a special protective device of becoming coated with mud, so that when adherent to the branch or trunk of a tree, the shell resembles a sessile bud, and on the ground or in other places simulates a misshapen piece of earth.

Pupilla muscorum L. is a circumpolar species, and is abundant, especially in the Wolds district of the East Riding. It possesses a complex generative system which is liable to the atrophy of the male organs, and is also ovoviviparous. It is recorded from the Holocene deposits at Hornsea, Sewerby and Flamborough.

The var. *marginata* has been found at Brough.

The name *muscorum* has been restored, as the type specimen in the Linnean collection is undoubtedly the edentulous form, and Draparnaud's name may be used for the unidentate form.

Lauria cylindracea Da Costa had the family trait of a complex generative system on the male side, and a liability to the atrophy of the male organs, and is also ovoviviparous. It possesses in its youthful stages of growth a series of three calcareous ridges on the floor of the basal whorl, which are clearly visible outside through the shell, they are regularly arranged and radiate from the umbilical region like the spokes of a wheel, and become absorbed in the full grown shell. There are also two spiral lamellæ, which wind spirally into the

interior of the shell, the parietal lamella is usually persistent, and the columella lamella occasionally persists and constitutes the var. *biplicata* Bourg.

It is common in our district, and is said to be partial to maritime influence, as its presence far inland indicates that an arm of the sea at one time extended there.

Lauria anglica Fér. has the calcareous radiating ridges and spiral lamelle as the preceding species, but the spiral lamelle are persistent, and form part of the apertural armature. It is also ovoviviparous, and liable to the atrophy of the complicated male organ. It is recorded from the East Riding at Filey and Flamborough Head.



*Vertigo anti-
vertigo.* $\times 20$

Vertigo antivertigo Drap. belongs a group of very minute species with a preference for a moist and watery habitat, and are generally without anterior tentacles. It ranges over the eastern and central districts of our area, being known from Hornsea Mere and elsewhere in Holderness, and found in a few spots in the Chalk Wolds. The male side of the sexual system is very complicated, as is usual. A single shell has been found by Mr. Sheppard in the Pleistocene marl at Bielsbeck.

Vertigo pygmaea Drap. differs from many of its congeners in presenting a very simple generative system which implies a different lineage. It is a common species in the East Riding, and is known from the Pleistocene marl at Bielsbeck. The var. *quadridentata* is recorded from Hedon by Mr. Petch.

Vertigo (Sphyradium) edentula Drap. is the commonest *Vertigo* in the East Riding. This species presents the unusual feature of two complicated flagella to the male organ of the sexual system and shows affinity to some of its more distant congeners. It has an Holarctic distribution, and is recorded from the loess of Iowa, U.S.A.

Vertigo (Sphyradium) minutissima Hartm. is local in our Yorkshire area, and has only as yet been found by Mr. Petch at Kilnsea Warren, in Holderness. All British specimens are edentulous, but continental shells may be dentate.

Fam. STENOGYRIDÆ Shuttl.

The Stenogyridae embrace the genera *Zua*, *Azea* and *Caecilioides*, and other foreign groups which are even more diverse in organization.

Zua and *Caecilioides* have a complicated male genital system, and in *Caecilioides* the columella is

abruptly truncated, while in *Zua* there are frequently perceptible signs of the same feature. *Azeca* has a more simply organized male sexual system, but has the aperture somewhat contracted by several denticles.

Azeca menkeana C. Pfr. is strictly European, and is sparingly found in the East Riding at Kirkham Abbey and at Danes' Dyke, Flamborough. It is somewhat similarly organized to *Zua*, but has not developed the flagellum to the male organ. This species is remarkable for the retention of what is assumed to represent the Clausium of the *Clausiliæ*, in the form of a rigid lamellar plate, now actually fused to the Columella and visible through the aperture of the shell. British specimens are all referable not to the type, but to the var. *nouletiana*.

Zua lubrica Leach ranges over the whole Holarctic realm, and is quite common in the East Riding. It has been found in Pleistocene marl at Bielsbeck by Mr. Sheppard, and Mr. Petch records it from the blue clay below the shell-marl at Bridlington. It has also been found in Post Pliocene loess in Iowa and in the "kitchen-middens" of Maine and Massachusetts.

The var. *lubricoides* was found at Harland Rise by Mr. Butterell.

Cæcilioides acicula Müll. is not uncommon in Holderness, and on the Wolds. The shell is characterized by its abruptly truncate columella. The animal is nocturnal and subterranean, and though blind has retained the ocula bulb which, however, is quite unpigmented. The sexual structure shows a complexity of the male organ and its accessories as in *Zua* and other groups.



*Azeca
menkeana*



Cæcilioides acicula.

Fam. CLAUSILIIDÆ.

CLAUSILIA Drap.

The *Clausiliæ* are a very ancient and recessive group of arboreal, mural or rupicolous habit characterized by the almost always consistent sinistral coiling of the shell, and by the development of the Clausium, a calcareous spatulate organ, approximately fitting the aperture of the shell, and furnished with a flexible

pedicle, which winds round and is attached to the columella, automatically closing the entrance when the animal retires inside, and which is absent in the most ancient fossils.

The group ranges over the world, and there are three chief areas of concentration, located in Europe, Asia and America. The South-east European centre claims the most dominant and modern species, which originated during the Pleistocene epoch, and belong to *Marpessa*, *Pirostoma*, etc., the most highly developed sections known. The sub-dominant Asiatic metropolis include, as prevailing types, *Phaciusa* and *Garnieria*, which formerly lived in Europe, and have spread therefrom, as is testified by their fossil remains in the Eocene and Oligocene strata of Europe. The sub-dominant South American colony, of which *Nenia* is the prevalent type are also immigrants from Europe as shown by their fossil remains in Miocene and Oligocene deposits, and by a solitary living species which still lingers in the Pyrenean region.

Clausilia (Pirostoma) bidentata Stiöm is locally common, but is chiefly restricted to the Wolds. It resembles most of its congeners in the tentacular retractor being quite free from entanglement with the sexual organs. It is crepuscular and nocturnal in habit, retiring to its retreat during the day. This species is mural or rupicolous in habit.

Clausilia (Marpessa) laminata Mont. is only known from the Wolds district. It differs from the genus generally in that the tentacular retractor separates the male and female organs. It is especially arboreal in habit. The var. *detrita* is found on larch trunks at Brough, the var. *tumidula* at Sledmere and the var. *albina* at Welton Dale.

Balea perversa L. Local, and rare in the East Riding, and only known from Wansford, Hull, Humbleton and Hedon. In its organic structure it stands close to *Ludia conica*; both are ovoviviparous, and their tentacular retractors are equally free from the sexual complex. It is in many parts a distinctly mural species.

Fam. SUCCINEIDÆ Chenu.

The Succineæ or "Amber Snails," of which two species are found in the East Riding, are in this country a very homogeneous group. The mandible is their most characteristic feature, being quite unlike that of any other genus in developing a very large and distinctly defined palatal appendage thereto, which projects above the jaw itself. The group which is undergoing shell degeneration and apparently also relinquishing a terrestrial life for an aquatic one; they live mostly in the vicinity of water, which, indeed, they have been observed to voluntarily enter.

The Succineæ are really ditrematous, the male and female orifices, though contiguous, being distinctly separate passages as in *Limnea*, which it also resembles in its inability to withdraw the foot within the shelter of the mantle and shell.

Succinea putris L. ranges over the East Riding, and is fairly common in suitable places. In the Pleistocene deposits it is recorded from the marl at Bielsbeck, and in the Holocene has been found at Hornsea, Neville's Dyke and Bridlington. Mr. Mortimer has also found large shells 18 mill. in length in a "barrow of Bronze Age" at Birdsall Brow

*Succinea putris* (L.)

The var. *vitrea* is recorded from Wressle and the banks of the Barmston drain.

Succinea elegans Risso is fairly well distributed over the East Riding, and it is recorded from the Pleistocene marl of Bielsbeck.

The var. *pfeifferi* is recorded from Wressle and Pocklington, the var. *albida* from Beverley, and the vars. *brevispirata* and *virescens* from Wressle.

Genus CARYCHIUM Müller.

Carychium is a minute snail, chiefly inhabiting moist places. The animal is ditrematous, and the male and female passages are well separated, and the animal, when

*Carychium minimum* $\times 16$

adult, usually almost totally absorbs the internal walls, and making of the interior a simple unpartitioned cavity.

It is very common in moist places in the three divisions of the district.

Fam. LIMNÆIDÆ Gray.

This group comprises *Limnaeinae*, *Physinae*, *Planorbinae* and *Ancylinae*, as well as subsidiary groups of probably diverse genealogy, but all were at one time exclusively air-breathing terrestrial animals, and have adopted an aquatic life, to which they are becoming more fully adapted by the development of auxiliary organs for water respiration; they may be regarded as the analogues of Seals and other warm-blooded marine animals.

Limnaea, in general and *L. truncatula* in particular is especially noteworthy as the usual intermediate host of several organisms, destructively parasitic upon man and certain domestic animals. Perhaps the best known of these are *Bilharzia* and *Fasciola*. *Bilharzia* is the cause of the Plague known from the time of the Pharaohs, and so fatal in Egypt, India and elsewhere. *Fasciola hepatica*, the Liver-fluke of the sheep is also very destructive, as in one year this parasite caused the death of 3,000,000 sheep in this country alone, and these examples are convincing evidence of the importance of the properly directed study of malacology.



Limnaea pergra var.
ocellata Drap.

Easington, etc.

The varieties observed are: *ocellata*, *deuminata*, *inflata*,

In the Fossil state *Limnaea* is found in the Wealden and Purbeck beds, and are in profusion in the Oligocene deposits of the Isle of Wight.

L. truncatula Mull. is abundant throughout the East Riding and Palaeoarctica. It is small but numerous in the Pleistocene marl at Bielsbeck, and in the Holocene beds has been found at Bridlington, Hornsea, Withernsea,

maritima, *ampullacea*, *oblonga*, *curta* and *stagnaliformis*, the last found at Buckton by Rev. W. C. Hey is the most interesting.

Limnea auricularia L. is rare in the East Riding, but commoner abroad. It has been found in the Holocene deposit at Hornsea by Mr. Sheppard.

Limnæa stagnalis L. Not common but well diffused in the district, and is widely diffused in Palæarctica and under the names of *L. jugularis*, *L. appressa*, etc., is well distributed in Nearctica. It is found in Holocene deposits at Withernsea, Skipsea, Holmpton, Atwick, etc. The var. *fragilis* is noted from Wressle and Kelsey Hill.

Limnæa palustris Müll. is well diffused but local in our area, and ranges over Palæarctica and a probable earlier race; under the names of *L. palustris*, *L. reflexa*, *L. elodes*, etc., is spread over North America. The recorded variations are: *elongata*, *corvus*, *tincta*, *stricta*, *baudoniana*, *lacunosa*, *minor*, *variegata* and *albida*.

Limnæa truncatula Müll., probably common throughout the Riding, and is a favoured intermediate host of various parasites at home and abroad. In North America identical or earlier forms are spread over the country under the names of *L. truncatula*, *L. humilis*, *L. desidiosa*, etc. It has been found in the Pleistocene marl of Beilsbeck, and is recorded from the Holocene of Hornsea and Bridlington.

Limnæa glabra Müll. Local, but usually plentiful where it occurs. It is irregularly distributed, and is probably decadent.

Amphipeplea glutinosa Müll. exhibits an advanced stage in the degeneration of the shell, which is exceedingly fragile and transparent, the whole shell being now almost entirely enveloped by the mantle when the animal is extended. This species is a striking example of periodicity, and existed in profusion in 1889 and 1890 in the Skidby drain, near Hull, and then disappeared.

Sub-fam. PHYSINÆ Gray.

The *Physinæ* are an ancient group that first appeared in the Lower Cretaceous, and is represented in our district by two sections, *Physa* and *Aplexa* both sinistrally coiled, and the animals possessing filiform tentacles.

Physa fontinalis L. possesses a shell which is evidently undergoing degeneration; the largely extended and deeply digitate mantle lobes now almost completely overlapping the

frail and delicate shell when the animal is extended. It is a common species in our district.

The vars. *inflata* and *oblonga* were found at Driffield by Mr. T. Brown.

Aplexa hypnorum L. is locally abundant in the Riding, and differs from the preceding species in the restriction of the mantle margin within the shell. It is also quite remarkable for the facility with which it spins mucus threads from point to point, and its constant use of them for ascent or descent or in other directions.

It is widely distributed over the whole Holarctic realm, the American specimens being very large.

Sub-fam. PLANORBINÆ H. and A. Adams.

The *Planorbinae* are interesting as Mollusks out of harmony with their protective shells, the animals being all sinistrally organized, while the formerly sinistral shells are now all dextral and have acquired the consequent secondary peculiarities indicating this. This reversal of the coiling, known as Hyperstrophy, is brought about by the gradually depression and sinking in of the spire, until it begins to appear on what was the basal or umbilical side, and the new umbilicus is at the same time developed on what in *Planorbis* was formerly the upper side. The *Planorbines* have also advanced a stage further than *Physa* or *Limnaea* in adaptation to aquatic life, having in some species developed a richly vascular lobe for aquatic respiration.

Segmentina lineata Walker is characterized by the lenticular form and brilliantly glossy surface of the shell, and by the presence of three or more chambers in the body whorl, each incompletely separated by three transverse calcareous septa which leave tri-radiate openings between them. It is a scarce species in the Riding, but is common in Hornsea Mere. In the fossil state it has only been found in the Holocene lacustrine deposits at Hornsea.



*Segmentina
lineata* W.

Planorbis fontanum Lightfoot, is only sparingly represented in the East Riding. It is found fossilized in the Holocene of Skipsea and Hornsea.

Planorbis nautilus L. is very common in almost every pond in the district bordering the Humber from Hull to Spurn, but is rarer inland. It is also one of the first shells to appear after reclamations. It is recorded from the Holocene of Hornsea, Mapleton, Atwick and Skipsea. The var. *crista* is abundant at Swinemoor, and many of the ponds and ditches of the district.



Planorbis nautilus
v. *crista* L. × 8

Planorbis albus L. is fairly common, but abundant in Holderness and the Wolds, and is fossilized in the Holocene deposits at Skipsea and Hornsea. In North America it is represented by *Planorbis hirsutus*, a probably ancient form of our species, which more fully retains its hispid epidermis.

Planorbis spirorbis Müll. is abundant throughout the Riding. It is found in the Pleistocene marl of Bielsbeck, as well as in the Holocene deposits of Bridlington and Hornsea.

Planorbis vortex L. is diffused rather unequally over the present district, and is recorded from the post-glacial deposits at Hornsea.

Planorbis carinatus Mull. ranges over Holderness and Derwentland, but is local and rare on the Wolds. It has been found in the Post-glacial deposits at Bridlington.

Planorbis marginalis Drap. is abundant generally, but is local in the Wolds. It is found commonly in the Pleistocene marl of Bealsbeck, as well as in the Holocene beds at Bridlington, Hornsea, Atwick, Skipsea, etc.

Planorbis cornutus L. is common, and ranges over the whole district. It is recorded from the Holocene marls of Holderness by Mr. F. W. Harmer.

The var. *major* (35 mill. by 14 mill.) is recorded from Boynton fish-ponds by Mr. L. B. Ross; the var. *minor* is from Newsholme. The beautiful variety with scarlet body and with the shell tinged with the same colour was found by Mr. Butterell in Spring Dyke near Hull.

Planorbis contortus L. is diffused over the East Riding. It is found plentifully in the Pleistocene marl at Bielsbeck, and in the Holocene deposits has been obtained at Hornsea and Skipsea. The var. *albida* was found in a ditch near the Ouse, below York, by the late Mr. W. Whitwell.

Sub-fam. ANCYLINÆ Gray.

The *Ancylinae* are further advanced in adaptation to an aquatic life than *Planorbis*, as they have now lost the pulmonary chamber, and water respiration is now

carried on by the skin and by a highly developed vascular lobe. The shell is degenerate, and is now reduced to a secondarily simple conical shape. They are divided into two groups, *Ancylus* and *Velletia*.

Ancylus, indicating by its vestigial coiling that it was once a well coiled sinistral shell, while *Velletia* shows its derivation from a dextral one.

Ancylus fluviatilis Müll. is almost restricted to the streams running from the Wolds. It was recorded by Dr. Lister in the seventeenth century from the Ouse, where it still occurs.



Ancylus fluviatilis.

Velletia lacustris L. is rare in the East Riding, but is represented in its three divisions. The var. *albida* occurs in Leckonfield moat. The elevated, laterally pinched form (var. *moquiniana*) is believed to be due to living constantly on the slender stems of the "Mares-tail," while the broad flat form (var. *compressa*) is induced by a life spent on the broad leaved reeds or "flags."

Fam. PALUDESTRINIDÆ.

The *Paludestrinidæ* are generally small species, with a corneous sub-spiral operculum, and are probably ovoviparous and parthenogenetic.

Paludestridna jenkinsi Smith is a very gregarious species, and when numerous often moves in orderly array. Carp are said to be very destructive to them. It is found in the Holderness district, and is common in the drains, etc., between Hedon and Marfleet. The rapid over-running of these islands is possibly only apparent, as the species may have existed here in limited numbers, and with the advent of exceptionally favourable period may have rapidly increased in numbers. I am inclined to view this problem as a striking example of periodicity, of which there are other examples among the Mollusca and other organisms. The species has long been known under the names of *Hydrobia ferussina* and *H. castanea* as an inhabitant of this country. Dr. Corner found many examples at Barking in 1897 associated with *Planorbis*, *Limnaea* and *Bithynia* at a depth of two or three feet in a thick bed of marsh clay, probably deposited within the "Historic" period, and captures of living specimens are known, made sixty or seventy years ago.

Genus *BITHYNIA* Prideaux.

This is a group of oviparous species, characterized by its shelly, concentrically striated operculum and by the possession of a crystalline stylet in the stomach.

Bithynia tentaculata Leach is common in the East Riding. In the Pleistocene marl at Bielsbeck, an undoubted operculum was found by Mr. Sheppard, and in the Holocene specimens have been obtained from the deposits at Skipsea, Hornsea, Bridlington, etc. It is a somewhat active Mollusk, and is a favourite food of Trout, Barbel and other fish, and is believed to contribute in imparting the admired flavour to Gillaroo and other famous trout. The male sexual organ is deeply bifid distally, the longer arm forming the intromittent organ, while the smaller section is believed to be excitatory in function. The var. *cornea* has occurred at Fleetdyke, Wressle, and *m. decollatum* at Hornsea.



*Bithynia
tentaculata*

Bithynia leachii Sheppard is an uncommon species, but is found at Wressle, Bubwith, etc., in Derwentland, and is common locally in Holderness. The var. *inflata* has been found at Hornsea by Mr. Butterell.

Fam. VIVIPARIDÆ H. and A. Adams.

This family is probably a waning group, and ranges over the world, though the typical genus is restricted to the northern hemisphere. It is characterized by its ovoviviparity and sexual dimorphism, the right tentacle of the male being modified to act as the protective sheath to the intromittent organ. As is the case with many Prosobranchs they do not possess an upper mandible, but a pair of extremely delicate lateral ones.

Vivipara cincta Millet occurs in the Ouse, near Wressle, in the Foulness river at Sandholme and also at Howden, Fulford, and in the Derwent, at Bubwith, a locality cited 250 years ago by Dr. Martin Lister. It prefers small ponds and tranquil ditches, it is apparently dominant over *V. vivipara*, and has its metropolis in this country in East Anglia.

Vivipara vivipara L. is said to be more partial to flowing

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still partial to moist habitats, its most usual resort being in the lowermost layer of decaying leaves close to or even beneath the surface of the ground, especially where there is a thick growth of the mycelia of fungi, where *A. lineata* sometimes swarms.

It has been found by Mr. Mortimer during the opening of two barrows of the "Bronze Age" at Garton Slack, near Driffield.

Fam. NERITIDÆ Gray.

Neritina is a very ancient group, dating back to Jurassic times, and now chiefly restricted to tropical countries. It is very primitive in its organization, the heart being pierced by the rectum as in the Bivalves. The calcareous operculum is very elaborate, and hinges on the columella; it is also attached to the animal by two retractors as in typical Dimyarian bivalves.

Neritina fluctuatus L. is found commonly in De-wentland and Holderness. It is an abundant species in the Ouse, and is found in the Derwent at Kirkham Abbey. In Holderness it is abundant in the River Hull, at Grovehill, and elsewhere.

The var. *ingresens* is found in the Ouse, near York.

Class PELECYPODA Goldfuss.

Order ECLAMELLIBRANCHIATA Pelseneer.

Fam. UNIONIDÆ Gray.

The *Unionidae* are of world wide distribution, and four species are known to occur within the East Riding area. They are the largest fresh-water bivalves known, and are diocious and often sexually dimorphic. The eggs are incubated in the outer gills, and when born become temporarily parasitic upon the gills and fins of fishes.

The *Unionidae* furnish another example which enforces that the Northern hemisphere, where the most

highly organized and most modern forms are found, is the birthplace of the group, and that as we advance southward, these highly organized and modern species are left behind, and we encounter forms more and more primitive, until we arrive at New Zealand, South America and South Australia, where, in their last refuge, before extinction, we find the most primitive life that now exists. This conclusion is supported by the whole organization of the animals, the hinge teeth, the ligament, the branchiae and their physiological

Fig. 10.—*Anodonta*

usage, the umbonal sculpture and by their geographical distribution.

All the *Unionidæ* produce Pearls, as do other groups of mollusks, but only those with a brilliantly iridescent inner layer to their shells can secrete those of commercial value.

The *Anodontæ* differ from the typical *Uniones* in being without the interlocking hinge teeth, but have a strong ligament, which fulfills every requirement as *Anodon* usually frequents lakes and still waters.

Anodonta cygnea L. is our largest fresh-water shell, sometimes reaching a length of nine inches. It is found in all the three divisions of the East Riding, but is most frequently found in the Wolds and in Holderness. Imperfect fossil specimens have been found in Holocene deposits at Mapleton and Skipsea by Mr. Petch, and in Post-glacial beds at Hornsea by Mr. Sheppard.

The var. *arenaria* has been found in Sutton drain by Mr. T. Brown, and in the Leven Canal by Mr. Butterell; the var. *incrassata* is doubtfully recorded as abundant at Hornsea.

Anodonta anatina L. differs from *A. cygnea* in its more oval shell and in the marked angular divergence at the anterior end, due to greater development of the Alæ, or "wings," and is also said to show divergence in the animal. It is



Unio pictorum.

only known from Holderness and Derwentland in the East Riding. In the fossil state it has been found at Hornsea in the Holocene peat beds by Mr. Clement Reid, and by Prof. Phillips at Owthorne. The var. *radiata* is recorded from Burstwick drain by Mr. Petch, and the var. *ventricosa* from Wressle by Mr. Roberts.

Unio tumidus Retz. has only been found in the East Riding in Holderness and Derwentland. It is a species of a somewhat oboval shape, and very inequilateral. It inhabits slow rivers and canals, and occupies a distinctly compact south central area in England.

Unio pictorum L. is not uncommon in Derwentland and Holderness. The shell is of an elongate oval shape, and is found in slowly flowing waters. Curiously enough, as though in retaliation for the parasitism of the larval Uniones upon fish, the Bitterling (*Rhodeus amarus*), a kind of minnow, deposits its eggs by means of a long ovipositor within the

siphon of the *Unio*, whence they pass into the branchiae, where they undergo development, and escape therefrom on hatching.

The vars. *radiata* and *curvirostris* are recorded from the Ouse below York, and Capt. Brown has recorded the var. *rostrata* from "the canal near Hull."

Genus SPHAERIUM Scopoli.

Sphaerium is almost equilateral in shape, with distinct cardinal and lateral hinge teeth. The mantle is largely open, and there are two distinct siphons at the posterior end. The *Sphaeriæ* can crawl on the surface in an inverted position when the foot is extended; they can also spin a mucus or byssal thread and suspend themselves by its means from the surface film of the water.

The genus is ovoviviparous, the young one being hatched in the gills, and are much flatter than adults.

Sphaerium corneum L. is a common species in the East Riding, and has been found in many Post-glacial deposits.



Sphaerium corneum × 2
var. *vittata*.

The var. *nucleus* is recorded from Bridlington by Dr. J. S. Gibbons, from Hedon by Prof. Harker, and from Wressle by Mr. Beanland; the var. *flavescens* was found in Barmston drain at Figham by Mr. Butterell, and the var. *regularis* at Wressle by Mr. G. Roberts.

Sphaerium lacustre Müll. is remarkable for its prominent and caliculate umbo, and belongs the group *Calyculina*. The calcification is due to the embryonic shell being more globose than the succeeding growth. In the East Riding it is rare in the Wolds, but common in Holderness. It has been found in the Holocene beds at Skipsea by Prof. Phillips.

The vars. *ryckholtii* and *jeannotti* were found by Mr. Butterell in a pond by Dames' Dyke, Flamborough.

Genus PISIDIUM C. Pfeiffer.

The *Pisidium* are minute bivalves, less specialized than *Sphaerium*, and differing from them in being very

inequilateral, and the anterior end of the shell being much more produced than the posterior, which carries the ligament. The branchial siphon is continuous with the great pedal opening, and only the anal tube is separately developed. The gills are utilized as incubatory pouches. The *Pisidia* are diæcious, and frequently swarming in ditches and drains which contain no other mollusk.

The hinge structure of this genus has of late years been intensively studied as a means of specific distinction as advocated by M. Bourguignat, but we must still look forward to an exhaustive study of the mollusk itself, and not of its shell alone.

Pisidium amnicum Müll. is found in a number of localities in Derwentland and Holderness; and in the fossil state has been found in the Bielsbeck Pleistocene deposit by Mr. Sheppard. It is the largest of our native species.



Pisidium amnicum.

Pisidium cinereum Alder is recorded from all three districts of the East Riding. It is widely distributed, and not uncommon generally.

Pisidium subtruncatum Malm was formerly known as *P. fontinale*, is well distributed throughout the Riding, and has been found in Holocene beds at Hornsea by Mr. Sheppard.

Pisidium pusillum Gmelin is very oval in shape, and is a widely spread species in the East Riding. Mr. Sheppard has found specimens in Pleistocene marl at Bielsbeck, and in Holocene deposits. It has been recorded from Hornsea, Bridlington, Atwick and other places.

Pisidium pulchellum Jenyns is sporadically spread over the East Riding. It is distinguished by the very strong and regular and distinct concentric ridges.

Pisidium nitidum Jenyns is recorded for all the three areas of the East Riding. It is, apart from hinge characters, best separated by the strong striæ between the neponic and later growth.

Pisidium milium Held is remarkable for its somewhat tumid and rhomboidal shape, and is yet only known in the East Riding from Holderness, as at Hornsea Mere, Hedon, Withernsea,

etc. It has been in Pleistocene marl at Bielsbeck and from the Holocene at Hornsea.

Pisidium obtusale Schmidt is distinguished by its tumidity, and by its bulky and prominent umbones, and has been found at Hornsea and Kelleythorpe. It is known also from a probable Pleistocene marl bed at Bielsbeck.

Pisidium henslowanum Sheppard is of a group which develops an external appendage on the umbo. It is apparently only known in the East Riding from Holderness and Derwentland.

Pisidium supinum Schmidt is regarded by some as probably an incrassate variety of *P. henslowanum*; it has the same trigonal form, and there is no serious difference in the hinge structure. It is only represented in South-east Yorkshire, by a rather curious small form, found in the Derwent at Thorganby by Mr. A. Smith, of York.

CRUSTACEA OF EAST YORKSHIRE

By E. PERCIVAL

AN account of the Crustacea of Yorkshire has been written in the "Victoria History of the Counties of England" (Yorkshire, Vol. I.), by the Rev. T. R. R. Stebbing, M.A., F.R.S., F.Z.S. The following list of forms found in the East Riding of the County has, by permission, been taken from the above-mentioned account.

It is evident from a comparison of the East Riding list with that of the rest of Yorkshire that much can be done in South-east Yorkshire, especially with regard to the non-marine Crustacea.

MALACOSTRACA.

Out of 60 species recorded for Yorkshire, 17 occur in the East Riding.

DECAPODA—BRACHYURA—CYCLOMETOPA.

Portunus depurator (Linn.) taken at Bridlington.

Carcinus maenas (Linn.). Along the coast.

Cancer pagurus, Linn. Along the coast.

Corynethes cassivelaonius (Pennant). Thrown up at Filey.

OXYRRHYNCHA.

Mamaia squinado (Herbst.) is said to have been taken at Filey in the dredge.

ANOMURA—PAGURIDEA.

Eupagurus bernhardus (Linn.). From Filey.

GALATHEIDEA.

Galathea strigosa (Linn.). From Filey. It is interesting that no mention of *G. squamifera* (Leach) is made for this part, as higher up the coast it is very common at low water.

Porcellana longicornis (Linn.). From Filey.

MACRURA NATANTIA.

Crangon vulgaris, Fabricius. At Filey.

Hippolyte varians, Leach. Along the coast.

TETRADECAPODA.

The recorded Isopoda are marine, and little attention appears to have been paid to the Woodlice of the East Riding. It would be profitable to work them in the district. The records include :

Idotea balthica (Pallas). At Filey.

Idotea emarginata (Fabricius). At Filey.

Jaera marina (O. Fabricius). At Filey.

Janira maculosa, Leach. At Filey.

Ligia oceanicus (Linn.). At Filey.

The Amphipoda are also few in number, and would probably repay any trouble spent in working the district. The known species are :

Talitrus saltator (Montagu). From Filey Brigg.

Gammarus marinus, Leach. From Filey.

Dexamine spinosa (Montagu). From Filey.

Corophium volutator (Pallas). From Filey.

ENTOMOSTRACA.

There is plenty of scope for workers of this group of Crustacea, especially since very little is known of

the Branchiopoda of the Riding. There do not appear to be any records of these forms from this district (East Riding), but judging from the fact that a species so far peculiar to Yorkshire—*Dactylura pubescens*, Brady—has been described, there must be many species of interest to be recorded.

OSTRACODA.

Of the 41 species of Ostracoda which have been obtained in Yorkshire, seven are recorded for the East Riding. They are (using the arrangement of Brady and Norman),

Family CYTHERIDÆ.

- Cythere confusa*, Brady and Norman. River Ouse.
C. macallana, Brady and Robertson. Sands from River Ouse.
C. albomaculata, Baird. Tidal pools, Filey Brig.
C. pulchella Brady., Tidal Pools, Filey Brig.
Xestolebris aurantia (Baird). Filey Brig.
Cytheropteron latissimum (Norman). Along the coast.

Family PARADOXOSTOMATIDÆ.

- Paradoxostoma hibernicum*, Brady. Filey Brig.

COPEPODA.

Of the 48 species of Copepoda so far found in Yorkshire, there are 16 recorded from East Riding.

Division CALANIDEA—Family TEMORIDÆ.

- Temora longicornis* (O. F. Müller). Tidal Pools, Filey Brig.

Family PONTELLIDÆ.

- Anomalocera patersonii*, Templeton. Off the Yorkshire Coast.

Family PARAPONTELLIDÆ.

Patrapontilla brevicornis (Lubbock). Bridlington Bay, and off the Yorkshire Coast.

Division ARPACTICIDEA Family LONGIPEDIIDÆ.

Longipedia scotti, Sars. Yorkshire Coast.

Family ECTINOSOMATIDÆ.

Ectimosoma sarsi, Boeck. Yorkshire Coast.

Family ARPACTICIDÆ.

Arpacticus chelifer (O. F. Müller). Tidal Pools, Filey Brig.

Zaus spinatus, Goodsir. Tidal Pools, Filey Brig.

Z. goodsiri, Brady. Tow-netted in Bridlington Bay.

Family TISBIDÆ.

Tisbe furcata (Baird). Tidal Pools, Filey Brig.

Family THALESTRIDÆ.

Dactylopusia tisbeides (Claus). Tidal Pools, Filey Brig.

Family DIOSACCIDÆ.

Laophonte thoracica, Baird. Tidal Pools, Filey Brig.

Cletodes limicola, Brady. Yorkshire Coast.

Paratachidius inermis, Brady. Among alge. Tidal Pool, Filey Brig. One specimen taken in 1897.

Division CYCLOPIDEA.

Oithona spinifrons, Bœck. Bridlington.

Euryte longicauda, Philippi. Yorkshire Coast.

Cyclops choricensis, Brady. Tidal Pools, Filey Brig.

THYROSTRACA.

The number of Cirripedia recorded from the Yorkshire Coast is small and most of them have been taken at Filey. The records do not appear to include any parasitic forms although Sacculina and Peltogaster are not usually uncommon.

The Cirripedes in the East Riding list are :

Balanus balanoides (Linn). From Filey.

Chthamalus stellatus (Poli). From Filey.

Verruca strömia (O. F. Müller). From Filey.

Lepas anatifera, Linn. From Filey.

Besides the free-living crustacea there are many parasitic forms which may be looked for, such as many Isopoda Epicaridea, some of which are found in the branchial cavities, etc., of Decapoda, e.g., Bopyridæ. Also the fish landed at Hull and elsewhere should yield many parasitic Copepoda.

There is no doubt that the above list does not by any means represent the Crustacean fauna of the East Riding of Yorkshire, especially considering that the terrestrial Isopoda and the freshwater Entomostraca have been practically untouched.

COLEOPTERA OF EAST YORKSHIRE

By W. J. FORDHAM, M.R.C.S., D.P.H., F.E.S.

THE coleopterist visiting Hull will find that he is within reach of several localities from which rare or interesting beetles have been recorded.

Comparing the East Riding with the rest of Yorkshire and with the British Isles as a whole, the list of interesting species is satisfactory, when the fact is taken into consideration that large tracts of the district have been apparently unworked, particularly in the plain of Holderness and the northern portion of the Wolds.

In the latest British list (1915) a total of 3470 species is catalogued, including 172 which are doubtful as British, occasional visitors, species presumably extinct, species introduced but not yet established, and probable errors. Between 50 and 60 species have been added to our Fauna since Messrs. Newbery and Sharp completed their survey. In the County of Yorkshire as a whole 2040 natives and 33 introduced or probably introduced species have been recorded, while in the East Riding 1164 natives and 22 introduced species are on record. This does not represent the full beetle fauna of the Riding, as many common and widely distributed species most certainly occur, but have not been placed specifically on record, and further work is required, particularly in the smaller species of *Staphylinidae* and *Curculionidae*.

As may be expected from the low elevation of the greater part of the district, most of the species of northern or montane distribution, which find their southernmost limit in the hilly districts of north-west and north-east Yorkshire, are absent. One or two exceptions, however, will be referred to later. Against this may be taken the extent of varying coast-line from Filey on the north to Spurn Point on the south from which many good insects may be obtained.

Species which are aquatic, riparian, or addicted to marshy habitats are by no means infrequent. The only large tract of water in the Riding is Hornsea Mere, but in the districts apart from the Wolds there is an abundance of small cattle ponds and drains which are productive of halophile species, and in one or two areas peaty pools which give several interesting oxylophiles. In addition are the saltmarsh or halophile species along the shores of the Humber.

Many species apparently reach their northerly limit of distribution in Yorkshire, and those, for which the most northerly recorded station is in the East Riding, are indicated in the following notes by an asterisk.

The Riding may, for the purpose of considering the beetle fauna, be roughly mapped out into the following areas :—

- (1). The environs of Hull and the Humber foreshore.
- (2). The coast line from Spurn to Filey.
- (3). The Plains of Holderness.
- (4). The Chalk Wolds.
- (5). The Valley of the River Derwent, including both the rich meadowland bordering the river and several outlying tracts of sandy common land.

A study of the distribution of insects is incomplete without reference to the Geology and Botany of the area in question, and for details in these matters the special chapters on the subject should be referred to.

(1). Taking the HULL DISTRICT first, it is of interest to recall that William Spence (well-known as part author of Kirby and Spence's classical *Introduction to Entomology*), was for several years a prominent citizen of Hull in the early part of last century. Many rare species of coleoptera were first noted in the county by him, and duly recorded by J. F. Stephens in his *Illustrations*, and also by Dawson, Curtis and others. *Nebria livida* F. was first discovered in the kingdom by Spence on the Humber shore, where it was formerly abundant. Up to more recent years it occurred on the site of St. Andrew's Dock, and may now be found in suitable localities along the coast from Spurn to Filey. Its distribution extends further north as far as Saltburn, and it is also taken as far south as Norfolk. *Haemonia curtisi* Lac. was first taken from a pond on the Humber shore, a quarter of a mile from his house, and for a considerable period this was the only known British locality. Other species taken near Hull by Spence include *Dyschirius nitidus* Dj., *Trechus rubens* F., *Philhydrus minutus* F., *Gyrophaena strictula* Er., *Heterothops binotata* Gr., *Nargus anisotomoides* Spence, *Catolfs sumatus* Spence, *C. watsoni* Spence, *Cateretes rutilabris* Lat. (in *Carex*), *Omosiphora limbata* F., *Anommatus 12 striatus* Mull., **Heterocerus lacvigatus* Pz. (since taken by Mr. Stainforth at Saltend), *Lixus paraplecticus* T. and *Poophagus nasturtii* Germ.

Also dating back from the beginning of last century is a record of *Licinus depresso* Pk. at Hull, taken by Mr. Watson in 1807 (Marsham MSS.).

Coming down to more recent times, much work has been done in the Hull district by Messrs. Russell, Stainforth, Johnson, Bilton, and Walsh, and many records are given in three local lists published in the *Transactions of the Hull Scientific and Field Naturalists' Club*, 1900, 1901, and 1903. A list of the beetles of the county as a whole may be consulted in the "Victoria County History of Yorkshire," in which Messrs. Bayford and Thompson give an account of the species known up to 1906. Since that date the Yorkshire Coleoptera Committee has published annual supplementary lists in *The Naturalist*, which will be found to contain many articles relating to the coleoptera of the county as a whole and the East Riding in particular. There is a collection of beetles in the Hull Museum, containing many interesting local insects, which should be seen by those desirous of gaining information on the subject.

The following beetles occurring in the neighbourhood of Hull call for special mention:—*Dyschirius salinus* Schm., *Bembidium varium* Ol., *Bem. lunatum* Duft. (abundant on the Humber foreshore), *Trechus micros* Hbst., *Pogonus chalceus* Marsh. (a rare insect in the north, abundant in cracks on the low clay cliffs above high water mark at Saltend, on the Humber shore, three miles east of Hull), **Panagaeus crux major* L. (Eastoft, Crawshay), **Ophonus rotundicollis* Fair. (one near Marfleet under drift), *O. puncticollis* Pk., *Acupalpus meridianus* L. (this species reaches its northerly limit in North Yorkshire), **Dichirotrichus obsoletus* Dj. (common on mud on Humber foreshore), *Anisodactylus binotatus* F. (rare in the north), *Laemostenus complanatus* Dj. (Hull Docks, very common under rubbish, near timber yards and in warehouses

and cellars,) **Blethisus maurus* Stm. (Marfleet and Saltend, also occurs at Bridlington), *Halipus striatus* Shp. (Welwick, in brackish water. This rare species has occurred at Teesmouth, North Yorks., in abundance, but this latter locality is destroyed by industrial developments. The only other British stations are Dumfries and in Suffolk), **Hygrobia tarda* Hbst. (This interesting beetle was re-discovered in Yorkshire at Paull by Messrs. Stainton and Bilton, by whom two specimens were taken in a pond on the Humber shore last year. It was taken plentifully in stagnant pools to the north of Withernsea in 1892 by Mr. W. F. Baker), *Cocclonus parallelogrammus* Ahr. (Marfleet and Saltend), **Hydroporus halensis* F. (Mr. Walsh took two specimens of this fenland species in a brackish stream at Welwick), **Noterus sparsus* Marsh (Saltend Common), *Agabus didymus* Ol. (rare in the north, but not uncommon in the Hull district), *Agabus conspersus* Marsh (in brackish pools), **Dytiscus circumflexus* F. (an interesting recent addition to our list. Taken at Saltend Common, Drypool and Cherry Cob Sands. This species occurs in fair quantity, and seems to outnumber both *D. marginalis* and *D. punctulatus* when the latter species occur with it. Mr. Stainton considers that it will prove to be the characteristic *Dytiscus* of the Humber littoral. It occurs in Norfolk, but has not yet been taken in Lincolnshire), *Gyrinus elongatus* Aubé., *Heleophorus mulsanti* Rye (Saltend Common, fairly abundant), *H. dorsalis* Marsh (a fen species which has occurred in a pond at Springhead), *Philhydrus maritimus* Th. (Marfleet and Saltend, rare in the north), *P. testaceus* F., *Tachinus proximus* Kr. (a northern species), *Oxyþorus rufus* L. (rare in the north, also occurs at Market Weighton), **Bledius*

tricornis Hbst. (Sunk Island, Archdeacon Hey), *B. spectabilis* Kr., *Coryphium angusticolle* Steph., *Brachygluta helferi* Schm. (Welwick at roots of *Atriplex portulacoides*, on the Humber shore, a saltmarsh species almost confined to S. and S.E. England, but taken in Scotland), *Liodes cinnamomea* Pz., *Hister merdarius* Hoff., **Nitidula rufipes* L., *Rhizophagus parallelocollis* Gyll., *Cartodere filum* Aub. (in herbarium, Hull Museum), **Litargus bifasciatus* F. (Cottingham, under oak bark), *Heterocerus britannicus* Kuw. (Saltend), *Limonius minutus* L., *Athous longicollis* Ol., *Telephorus fuscus* L., *Malthinus fasciatus* Ol., *Thanasimus formicarius* L., **Grammoptera analis* Pz. (Springhead, one on umbellifers), **Donacia dentata* Hopl. (Sutton Drain on *Nuphar*), **D. sparganii* Ahr. (Sutton and Barmston Drains), **Plateumaris braccata* Scop. (Marfleet, in profusion in a limited area in a brackish ditch on *Phragmites*), *Chrysomela marginata* L. (Lamwath Drain, Sutton), *Phædon concinnus* Steph. (Saltend shore), **Phyllotreta punctulata* Marsh, *Omias mollinum* Boh., *Bagous tempestivus* Hbst., *Orthochaetes setiger* Beck., **Anthicus antherinus* L. (Pill Wood, Cottingham), and **Phloeotrya rufipes* Gyll. (Ganstead, one in decaying willow, winter, 1895, C. W. Russell).

Many imported species are taken in and about Hull and include *Nemosoma elongatum* L. (Alexandra Dock), *Tenebrioides mauritanicus* L., *Bostrichus capacinus* L. (imported oak), *Gibbium Scotias* F., *Rhagium indagator* F. (Alexandra Dock), *Callidium variabilis* L. (in house, Hull), *C. violaceum* L. (imported birch), *Monochammus sutor* L. and *sartor* F. (occasional, Docks), and *Acanthocinus ædilis* L. (sometimes in fair numbers, Docks). A specimen of *Lucanus cervus* L. was taken alive in Beverley Road, Hull, and may be seen in the Municipal

Museum. In tidal refuse at Marfleet in decaying onions have occurred *Carpophilus hemipterus* L. and *C. mutilatus* Er.

(2). Taking next the COAST LINE into consideration there are numerous species which are generally distributed in suitable localities from Spurn Point to Filey Brig, including many insects already enumerated as occurring in the Hull district and on the Humber shore.

Nebria livida F., the Yorkshire Coast speciality *par excellence*, is to be found in crevices in the boulder clay cliffs. It is common in June at Sewerby, near Bridlington, and also to the south of Filey, where it occurs about 4 to 5 feet up the cliffs. The search during the day time for this beetle is laborious, involving, as it does, the splitting off of loose pieces of cliff, but the insect may be taken not uncommonly at dusk and after dark, when, by the aid of a lantern, they may be discovered running about at the base of the cliffs.

Other generally distributed species are *Dyschirius thoracicus* Ross (which is fairly common and occurs at Bridlington in Cliffs to the south, in profusion in the loose sand together with *Bledius arenarius* Pk.), *Bembidium anglicanum* Shp., *B. stephensi* Crotch., *Amara convexiuscula* Marsh and *Cleonus sulcirostris* L. (Spurn to Bridlington).

At Spurn and in the immediate neighbourhood may be taken *Calathus fuscus* F. (rare in the north), *Berosus luridus* L., **B. signaticollis* Charp., **B. affinis* Brul., *Ocypus similis* F. and *ater* Gr., *Xantholinus tricolor* F., **Stenus incrassatus* Er., **Aphodius nitidulus* F., *Anomala aenea* L.G. (with its unicolorous variety), **Barypithecus pellucidus* Boh., **Cediosoma spadix* Hbst.

(on groynes, also on Humber banks. Nearly all localities are in S. England, but occurs in Lincs.), **Phaleria cadaverina* F. (drift), **Crypticus quisquilius* L. *Heliopathes gibbus* F., **Helops pallidus* Curt. (in profusion), and *Phytonomus fasciculatus* Hbst. (at *Erodium* roots. This species has also been taken in a sandpit at Flixton).

At Withernsea occur *Notiophilus punctatus* Dj., *Pterostichus picimanus* Duft. and *Cafius fucicola* Curt.

Hornsea is celebrated for its famous Mere, from whence are recorded many good species: *Bembidium obliquum* Stm., **B. assimile* Gyll., *Trechus discus* F., *Chlaenius tristis* Schal. (a very rare species recorded by Dawson which was formerly taken here. It is interesting to note that remains of this insect have been found in "moorlog" from the Dogger Bank), *Oodes helopoides* F., *Pterostichus anthracinus* Ill., *gracilis* Dj. and *minor* Gyll., **Agonum gracilipes* Duft. (a doubtful record resting on a specimen taken in 1858 by W. K. Bissell, and unfortunately lost before it had been satisfactorily determined), **Haliplus mucronatus* Steph., *H. variegatus* Stm., *Noterus crassicornis* Müll. (reaching its northerly limit at Askham Bog, where it is common), **Deinopsis erosa* Steph., *Philonthus umbratilis* Gr. *corvinus* Er. and *micans* Gr., *Paederus riparius* L., numerous species of *Stenus*, including **morio* Gr. (a rare southern insect), **vafellus* Er. and *palustris* Er. (a fen species taken as far north as Scarborough only), **Bryaxis longicornis* Leach (in dead reeds with **Corylophus cassidioides* Marsh), *Trachys troglodytes* Gyll. and *Donacia impressa* Pz. and *thalassina* Germ.

Bridlington is well known to coleopterists through the work of Canon Fowler, who took many "good"

beetles here, including one specimen of *Harpalus calcicollis* Stm., a doubtful native, in August, 1879, in a sandy place on the cliffs. The only other British capture of this species was in 1830 at Swansea. It is common in France.

On the south side of the town about half to three-quarters of a mile along the shore, Canon Fowler took a small and curious form of *Dyschirius politus* Dj. sparingly. It occurred in company with a profusion of *Bledius dissimilis* Er., which has no other recorded British locality. The *Bledius* burrows in the clay cliffs, where the casts are very conspicuous from a few feet above high water mark almost to the top of the cliffs, and always requires digging for. *Stenus melanopodus* Marsh also was plentiful in damp places on the shore with *Bledius arenarius* Pk. and *Dycheirus thoracicus* Ross. Bridlington appears to be the headquarters in Yorkshire of the genera *Dyschirius*, *Amara* and *Bledius* of which latter genus no fewer than 10 species have been recorded, including *B. opacus* Block. Other *Dyschirii* are *aeneus* Dj. and *salinus* Schm., and among the *Amaræ* are *consularis* Duft., *aulica* Pz., *convexuscula* Marsh, *bifrons* Gyll. and *acuminata* Pk.

Geotyssus pygmaeus F. is found in damp places some little way up the cliffs, and at Sewerby the brilliant **Chlaeniuss vestitus* Pk. is not uncommon. Other species include *Platynotus rugicollis* Marsh, *Athetasticta* Steph., *Lathrobium multipunctatum* Gr. and *Phytonomus alternans* Steph. Mr. W. E. Sharp bred **Ouedius tricornis* Th. from larvae taken in a moles' nest, a species only previously taken from birds' and wasps' nests, and also took *Ouedius ethiopicus* Johan and *Heterothops nigra* Kr. in the same habitat.

An extremely interesting note by Mr. Sharp on the

Dispersal of coleoptera will be found in the *Entomologist's Record* for 1909, which refers to a flight of enormous numbers of various species of beetles on the sands at Bridlington.

Further north, at Flamborough, no fewer than 120 species of coleoptera were taken on the occasion of a visit of the Yorkshire Naturalists' Union, and from the headland many years ago, Mr. Wollaston obtained *Atomarii fimetarii* Hbst., *A. berolinensis* Kr. and *A. fuscipes* Gyll., the latter in immense profusion by sweeping the grass at the cliff edge.

At Filey the coleopterist will find many interesting species. The boulder clay cliffs are prolific. Many *Bembidia* are abundant, but *Dyschirii* are not recorded, but should certainly occur. There are some pools on the cliffs to the south which produce many *Hydropori*, including *umbrosus* Gyll., *discretus* Fair and *nigrita* F. Filey is possibly the most southerly recorded station for *Sitones lineellus* Gyll., and other species on record include *Ophonus puncticollis* Pk. (in flower heads), *Stichoglossa corticina* Er., *Atheta insecta* Th., *Leptinus testaceus* Müll. (from nest of field mouse with *Cryptophagus umbratus* Et.), *Subcoccinella 24 punctata* L., *Hippodamia 13 punctata* L., **Adonia variegata* Goez., *Cassida hæmispherica* Hbst. (one on grassy sides of cliffs, Canon Fowler), **C. vibex* F. (on thistles), and **Tychius lineatulus* Steph. (very rare north of London).

(3). THE PLAINS OF HOLDERNESS are somewhat inaccessible and have been little worked. Here we may refer to Beverley, where the low lying parts in the neighbourhood of the River Hull are rich in aquatic and marsh beetles. *Brychius glabratus* Villa, *Hydroporus assimilis* Pk., *Platambus maculatus* L. and *Gyrinus opacus* Sahe are recorded, and *Donacia*

sparganii Ahr., *versicolorea* Brahm, *vulgaris* Zsch. and *servicea* L. occur on water plants. *Mycetophagus piceus* F. has been found on Swine Moor.

(4). THE CHALK WOLDS have been approached from several points, the majority within easy reach of Hull.

In the vicinity of Brough have been taken *Ophonus ruficola* Stm., *Bembidium minimum* F., *Lebia chlorcephala* Hoff., *Hydropsyrus memnonius* Nic., *Bolitochara lucida* Gr., *Pæderus littoralis* Gr., *Necrodes littoralis* L., *Soronia grisea* L., **Trachys minuta* L., *Hedobia imperialis* L., *Chrysomela varians* Schr., and *hyperici* Forst., *Scaphidema metallicum* F. and *Pissodes pini* L.

At Wauldby Green **Dorcus parallelipipedus* L. has occurred in large numbers in decayed ash logs. Near South Cave and Weedley, Mr. Stainforth has taken **Trichonyx markeli* Aub. with the ant *Lasius flavus*, and *Staphylinus stercorarius* Ol. in company with *Myrmica scabrinodis*. He also discovered the larvae of the glow worm *Lampryis noctiluca* L. in the fleece of a sheep's carcase. At Newbald **Siagonium quadricorne* Kirby has occurred under ash bark and at Houghton Woods *Pselaphus heisci* Hbst. and *Hypoganaspis repens* Hbst. are common. Several species are recorded from Market Weighton, the most noteworthy being *Omosiphora limbata* F. Further north, *Hydroporus rivalis* Gyll. has been taken at Driffield together with a few other water beetles. *Chrysomela marginalis* Duft. occurred some years ago in new mown grass at Wetwang, near which place may be taken *Pterostichus anthracinus* Ill. and *Staphylinus erythropterus* L., and at Flixton, on the northern slope of the Wolds, Mr. Walsh has taken the rare *Syncalypta setigera* Ill. in a sand pit. The majority of the British records of this



SAILORS' ORPHANS' HOMES, NEWLAND, HULL.

species probably refer to *spinosa* Rossi, but true *setigera* is also taken in the Solway district and in Hants at Barton-on-Sea. Canon Fowler records (*Brit. Col.*, Vol. IV.) that **Orsodacna lineola* Pz. was taken commonly in a wooded valley on the Yorkshire Wolds on meadowsweet in July by Mr. Harker, but no more precise locality is given.

(5). The lower portion of the DERWENT VALLEY, near Bubwith, has furnished many rare and interesting beetles to the writer. The wide expanse of meadow on either side of the river, locally termed "Ings," and periodically flooded by the waters of the Derwent, is very productive of good species, and after a flood the refuse is alive with myriads of insects, and many local species of *Atheta* have been taken, including *A. luteipes* Er. (a marsh and river species, mainly found in the south, but recorded from the Isle of Man and Ireland), *A. curax* Kr. (a northern species, taken, however, in Devon), **A. languida* Er. (a rare southern species), *A. malleus* Joy. *A. aubei* Bris. (only otherwise found in Scotland and at Horning), *A. debilis* Er. (sometimes extremely abundant), *A. britteni* Joy., *A. angustula* Gyll, **A. nigella* Er., **A. decipiens* Sharp. (rare in the south), and *Plagiarthrina fordhamiana* Keys (described on specimens from Bubwith flood refuse sent to Mr. Keys in January, 1919.). Other beetles mainly taken in the refuse are *Ocyusa maura* Er., *Calodera aethiops* Gr., *Tachyusa atra* Gr. (often abundant), *Philonthus nigritulus* Gr., *pennatus* Shp. and *appendiculatus* Shp., *Platystethus nitens* Sahl. and **Trichopteryx fratercula* Matt. (only previous record, Market Harborough).

In the ditches and drains intersecting the Ings, water beetles are abundant, the most noteworthy being

Agabus uliginosus L. with the var. *dispar* Bold. of the female, *Dytiscus dimidiatus* Berg. and *D. circumcinctus* Ahr. (both of which latter species reach their northerly limit at Askham Bog, and only occur rarely elsewhere in the Fens and South England. It is worth noting that many of the local insects taken at Askham Bog occur also in the Lower Derwentland), and *Ochthebius rufimarginatus* Steph. Marshy places produce *Blethisa multipunctata* L., *Bembidion doris* Pz., **Anthracus consputus* Duft., *Hygronoma dimidiata* Gr., *Philonthus micans* Gr. (not uncommon), *Stenus ater* Man. (a species chiefly recorded from chalky districts in the S. and S.E.) *S. argus* Gr. and *S. carbonarius* Gyll., and on herbage by the river occur **Pria dulcamarae* Scop., *Meligethes fulvipes* Bris. (a few species reaching its northerly limit on Tees-side), **Corymbites metallicus* Pk. (not uncommon on thistles and umbellifers, and also taken at Bridlington), *Cryptophygnus pustulatus* F., *Limonius cylindricus* Pk., *Cyphon punctipennis* Shp. (a rare northern species), *Telephorus thoracicus* Ol., *Galerucella pusilla* Weise, *Chalcoides chloris* Foud., *Erirhinus bimaculatus* F. and *Rhinoncus gramineus* F.

Moles' nests have produced most of their characteristic species wherever examined, and these beetles are probably widely distributed in the Riding. *Aleochara spadicica* Er., *Oxytoda longipes* Muls. (once only), *Athetis paradoxus* Rey., *Quedius longicornis* Kr. (twice), **Q. nigrocruciatus* Rey. (occasionally fairly frequent), **Q. brevicornis* Th. (twice), *Q. othiniensis* Johan (the commonest species together with *Aleochara spadicica*), and *Hister marginatus* Er. (frequent, but usually singly).

Other noteworthy species taken in the district include *Oxytes fuscatus* Gr., *Philonthus nigritiventris* Th.

(a rare species, in dead hedgehog), *Cerylon fagi* Bris., *Megatoma undata* L., *Agrilus angustulus* Ill. (on oak near Melbourne. York is the most northerly record for this beetle), **Corynetes caeruleus* Deg., *Clytus mysticus* L., and *Cryphalus abietis* Ratz.

In the woods at Escrick many good species occur. *Dryophilus pusillus* Gyll. is common on conifers and oak, and **Molorchus minor* L. has been taken on a hawthorn hedge. The rare *Hydrothassa hannoverana* F. was formerly taken at Fulford within the East Riding area by Mr. R. Cook, who also took *Agrilus viridis* L. at Langwith, also in the vice-county, a very rare species of which few specimens have been taken.

Stamford Bridge on the Derwent gives many of the species which occur in the Bubwith district with the addition of *Limnebius picinus* Marsh, which is also found at Askham Bog and apparently extends no further north. Though just outside the East Riding area, a visit to Askham Bog, near York, would well repay the coleopterist, but the majority of the water beetles for which it is famed, occur early in the year.

It only remains to notice the insects which occur on the sandy commons of Skipwith and Allerthorpe. The tiger beetle, *Cicindela campestris* L. is abundant on both, together with *Carabus nitens* L. (sparingly), *Coccinella hieroglyphica* L. (and many varieties), **Litargus bifasciatus* F. (in fungus on birch stumps in colonies of 6 to 12, and very agile; occasionally almost black), *Geotrupes typhaeus* L. and *Dorytomus salicis* Walt.

Skipwith Common contains numerous pools from which may be taken *Haliplus immaculatus* Gerb., *Hydroporus nigrita* F., *vittula* Er., *tristis* Pk., *umbrosus* Gyll., *melanarius* Stm. (very large and fine) and many

others. *Agabus unguicularis* Th. and *femoralis* Pk., *Copelatus ruficollis* Schal., *Hlybius guttiger* Gyll., *Rhantus graphii* Gyll. (most northerly at Askham Bog), *Philhydrus minutus* F. and *nigricans* Zett., and *Heleochares lividus* Forst. *Blethisa multipunctata* L. has been taken under dry felted algae round the ponds, and *Gymnusa brevicollis* Pk. is occasional in sphagnum. Other species taken on the common include *Aleochara cunicularum* Kr., *Gryophana bihamata* Th., *Philonthus atratus* Gr., *P. stipes* Sharp, *Endomychus coccineus* L. and *Aromia moschata* L.

Allerthorpe Common is somewhat drier and here at the roots of heather may be taken *Carabus arvensis* Hbst., *Misodera arctica* Pk. (an interesting locality for this montane species which, however, occurs under slag on Tees mouth), *Amara lunicollis* Sch. (an entirely black form not uncommon), *A. consularis* Duft., *Pterostichus lepidus* F. and *P. vitreus* Dj. (both the latter usually montane). In fungus on birch stumps and under the bark occur *Cryptophagus ruficornis* Steph., **Diphyllus lunatus* F. and *Cis villosulus* Marsh.

The writer will be pleased to give further details to any coleopterist visiting Hull for the British Association Meeting, and will be grateful, on behalf of the Yorkshire Coleoptera Committee for particulars of any work done in the Riding during the visit.

THE LEPIDOPTERA OF HULL

By G. T. PORRITT, F.L.S., F.E.S.

AT the request of the local secretaries of the Hull Meeting of the British Association (September, 1922), I have revised the List of Hull Lepidoptera as given by Mr. J. W. Boult in the *Transactions of the Hull Scientific and Field Naturalists' Club*, Vol. I., pp. 55-64, and 115; Vol. III., pp. 102-3. There is little to add, for, as Mr. Boult states, the district is not a rich one in lepidoptera, and seems to have been but little worked by anyone but Mr. Boult for many years. The species I have marked with a * Mr. Boult added on the supposed authority of the late Mr. George Norman, but I cannot help thinking there must have been some mistake regarding, at any rate, some of them. Such mistake would not be George Norman's, as every lepidopterist who knew him, knows he was a most careful and accurate observer and recorder. But it is not in the least likely that such species as *Noctua subrosea*, *Dicycla oo*, and some others in the list ever occurred, and probably most of them, if they did occur, must have been merely casuals on such ground as is to be found within Mr. Boult's radius of eight miles of Hull.

Since the paragraph on *Eupithecia extensaria* was written (copied from the "List of Yorkshire Lepidoptera"), the headquarters of the species in Britain has been found on the Norfolk coast, where it has been

obtained in large numbers by myself and others. The locality is almost immediately opposite Spurn, where our own first county specimen was taken, and which was probably (as also the Hull example) a casual from the Norfolk locality. The butterfly *Arge galathea* still occurs in numbers at Sledmere and in other localities in that part of the York district. The Pyrale recorded in the list as *Ebulca stachyialis* should, no doubt, be *Ebulca Sambucalis*; and unless the bilberry grows freely somewhere in Mr. Boult's area, it is tolerably certain that the Tortrix given as *Euchromia mygindana* was wrongly determined.

BUTTERFLIES.

Diurni.

Papilio machaon.

"There is satisfactory evidence that this fine species formerly occurred with us, although it has long been extinct. At page 27 of Haworth's 'Lepidoptera Britannica' (1803), we read 'I know Machaon, the common swallow-tailed *Papilio*, breeds near Beverley yet, and my brother-in-law, R. Scales, of Walworth, near London, possesses a specimen of it which was taken there thirty years since.'

Some years very common, other years very rare.

Common in gardens.

Common in lanes.

Common.

One in Pearson Park by Mr. Peak; one in Queen's Road, 1887.

Occasional. Common in 1877 or 1878.

Few in 1877 or 1878.

Very common.

Two at Billingham 1888.

One in Queen's Road. "This little and rare species has at different times been taken in almost every part of the county. In 1872 it occurred in numbers all over England,

Pieris brassicæ.

Pieris rapæ.

Pieris napi.

Anthocharis cardamines.

Coenonympha pamphilus.

Colias edusa.

Colias katherina.

Vanessa urticæ.

Vanessa polychloros.

Vicia cracca.

<i>Vanessa io.</i>	and in our own county was almost common."
<i>Vanessa atalanta.</i>	It was taken at Hull, Hornsea, Beverley (in numbers), and many other places.
<i>Vanessa cardui.</i>	Occasional.
<i>Argo galathaea.</i>	Common.
	Some years common, other years scarce.
	" At one time a well-known Yorkshire butterfly, but now probably extinct. 'Near Beverley formerly, but probably extinct there.'
<i>Satyrus megæra.</i>	Occasional. Sutton Bank.
<i>Satyrus janira.</i>	Common.
<i>Satyrus tithonus.</i>	Occasional. Sutton Bank.
<i>Chortobius davus.</i>	Cottingham, now extinct.
<i>Chortobius pamphilus.</i>	Common. Humber Bank.
<i>Polyommatus phlæas.</i>	Occasional.
<i>Lycæna alexis.</i>	Common.
<i>Lycæna argiolus.</i>	One, end of July, 1897, Westbourne Avenue.
<i>Thaumos tuges.</i>	One, Humber Bank, Hessle, 1884. Formerly very common there, now extinct.
<i>Hesperia sylvanus.</i>	One, Sutton, July, 1888. One, Victoria Avenue, 1889.

MOTHS.

<i>Nocturni.</i>	
<i>Smerinthus ocellatus.</i>	Occasional. Was formerly common on willows, Wold Carr.
<i>Smerinthus populi.</i>	Common.
<i>Acherontia atropos.</i>	Occasional.
<i>Sphinx convolvuli.</i>	Occasional.
<i>Sphinx ligustri.</i>	Larvæ, Southcoates Lane, 1884.
<i>Deilephila galii.</i>	Hull, 1859.
<i>Chærocampa celerio.</i>	Brantingham, 1865.
<i>Chærocampa porcellus.</i>	Near Hull, 1859.
<i>Chærocampa elpenor.</i>	One, Dairycoates, June 10th, 1898.
<i>Macroglossa stellatarum.</i>	Occasional.
<i>Sesia tipuliformis.</i>	Occasional, common in some gardens.
<i>Sesia bembeciformis.</i>	Common.
<i>Cossus ligniperda.</i>	Occasional.
<i>Hepialus lupulinus.</i>	Very common.
<i>Hepialus sylvinus.</i>	Occasional.
<i>Hepialus velleda.</i>	One, Humber Bank.
<i>Hepialus humuli.</i>	Very common.
<i>Procris geryon.</i>	Beverley, Ent. Ann., 1864, p. 122.
<i>Zygæna lonicerae.</i>	Common, West Humber Bank, down to 1888. Now extinct.

<i>Zygaena filipendulae.</i>	Banks of Marfleet Drain.
<i>Nolana pallatella.</i>	Common.
<i>Lithosia quadra.</i>	One at British Gasworks.
<i>Lithosia juno.</i>	Occasional.
<i>Chelonia caja.</i>	Common.
<i>Arctia fuliginosa.</i>	Occasional. Common on West Humber Bank down to 1880.
<i>Arctia lubricipeda.</i>	Very common.
<i>Arctia menthastris.</i>	Common.
<i>Liparis auriflava.</i>	Very common.
<i>Liparis salicis.</i>	Few, Park Street, Spring Bank, Park Road, 1888.
<i>Orgyia antiqua.</i>	Common.
<i>Pactylampa populi.</i>	Occasional.
<i>Bombyx rubi.</i>	Formerly abundant near Cottingham, now extinct.
<i>Bombyx quercus.</i>	Formerly abundant, now becoming scarce.
<i>Odonestis potatoria.</i>	Formerly abundant, now becoming scarce.
 <i>Noctuæ.</i>	
<i>Tivalira dorata.</i>	Occasional.
<i>Thyatira batis.</i>	Hessle Road.
<i>Cymatophora duplaris.</i>	Holderness, Beverley, etc.
<i>Bryophila perla.</i>	Common.
<i>Acronycta tridens.</i>	Occasional.
<i>Acronycta psi.</i>	Common.
<i>Acronycta leporina.</i>	Four larvæ on poplar, Spring Bank.
<i>Acronycta megacephala.</i>	Occasional.
<i>Acronycta alni.</i>	One, Spring Bank West, June, 1898. Brantingham, E.W.I., viii., 1895. Beverley.
<i>Acronycta ligustri.</i>	Occasional.
<i>Acronycta rumicis.</i>	West Humber Bank (1891).
<i>Leucania comma.</i>	Common, West Humber Bank.
<i>Leucania lithargyria.</i>	Very common.
<i>Leucania comma.</i>	Common.
<i>Leucania impura.</i>	Very common.
<i>Leucania pallens.</i>	Formerly common, becoming scarce.
<i>Leucania phragmitidis.</i>	Occasional.
<i>Nonagria fulva.</i>	Larva common in stems of bulrush.
<i>Nonagria typhæ.</i>	Common, West Humber Bank.
<i>Nonagria lutosa.</i>	Formerly very common, now very scarce.
<i>Gortyna flavago.</i>	Occasional.
<i>Hydræcia nictitans.</i>	Beverley.
<i>Hydræcia petasitis.</i>	Occasional.
<i>Hydræcia micacea.</i>	Common.
<i>Xylophanes cypris.</i>	Common.
<i>Xylophanes luteola.</i>	Common.
<i>Xylophanes polyodon.</i>	Very common.

<i>Xylophasia hepatica</i>	Occasional, West Humber Bank.
<i>Neuria saponariæ</i> .	Occasional.
<i>Heliophobus popularis.</i>	Occasional.
<i>Charæas graminis.</i>	Occasional.
<i>Cerigo cytherea.</i>	Common, West Humber Bank.
<i>Luperina testacea.</i>	Common.
<i>Mamestra anceps.</i>	Occasional.
<i>Mamestra abjecta.</i>	Hull.
<i>Mamestra albicolon.</i> •	Occasional.
<i>Mamestra brassicæ.</i>	Very common.
<i>Mamestra persicariæ.</i>	One larva beaten from elder tree, Hessle Road.
<i>Apamea basilinea.</i>	Common.
<i>Apamea gemina.</i>	Common.
<i>Apamea unanimis.</i>	Larvæ common where food is found plentifully.
<i>Apamea fibrosa.</i>	Three at sugar, West Humber Bank, 1894.
<i>Apamea oculæa.</i>	Common.
<i>Miana strigilis.</i>	Very common.
<i>Miana fasciuncula.</i>	Very common.
<i>Miana literosa.</i>	Some years common, others scarce.
<i>Miana furuncula.</i>	Common locally.
<i>Miana arcuosa.</i>	Occasional.
* <i>Celæna haworthii.</i>	Hull.
<i>Grammesia trilinea.</i>	Common, West Humber Bank.
<i>Caradrina morpheus.</i>	Occasional.
<i>Caradrina alsines.</i>	Common, West Humber Bank.
<i>Caradrina blanda.</i>	Occasional, West Humber Bank.
<i>Caradrina cubicularis.</i>	Common.
<i>Rusina tenebrosa.</i>	Beverley, common, the specimens not being so dark as Scotch examples.
<i>Agrotis suffusa.</i>	Common.
<i>Agrotis saucia.</i>	Occasional.
<i>Agrotis segetum.</i>	Very common.
<i>Agrotis exclamatiōnis.</i>	Very common.
<i>Agrotis nigricans.</i>	Occasional.
* <i>Agrotis porphyrea.</i>	Hull.
<i>Agrotis ravida.</i>	Common in some years, not found in others.
* <i>Agrotis pyrophila.</i>	Hull.
<i>Tryphæna janthina.</i>	Occasional.
<i>Tryphæna fimbria.</i>	Occasional.
<i>Tryphæna interjecta.</i>	Few larvæ, Willerby Lane, 1890.
<i>Tryphæna orbona.</i>	Common.
<i>Tryphæna pronuba.</i>	Very common.
<i>Noctua angul.</i>	Common.
<i>Noctua plecta.</i>	Common.
<i>Noctua C-nigrum.</i>	Common.
* <i>Noctua subrosea.</i>	Hull.
<i>Noctua festiva.</i>	Occasional.

<i>Noctua dahlii.</i>	Occasional.
<i>Noctua rubra.</i>	Occasional, West Humber Bank.
<i>Noctua umbrosa.</i>	Common.
<i>Noctua baja.</i>	Few at sugar.
<i>Noctua xanthographa.</i>	Very common.
<i>Trachea piniperda.</i>	Beverley, common, "the green variety also occurs in some quantity."
<i>Tæniocampa gothica.</i>	Common.
<i>Tæniocampa rubricosa.</i>	One, Hedon Road, 1880.
* <i>Tæniocampa populeti.</i>	Cottingham.
<i>Tæniocampa stabilis.</i>	Common.
<i>Tæniocampa gracilis.</i>	Beverley, scarce.
<i>Lamia campestris miranda.</i>	Occasional.
<i>Tæniocampa cruda.</i>	Beverley.
<i>Orthosia suspecta.</i>	Three in Park Avenue, 1880.
<i>Orthosia ypsilon.</i>	Occasional on willows.
<i>Orthosia lota.</i>	Common.
<i>Orthosia macilenta.</i>	Beverley.
<i>Anchocelis pistacina.</i>	Very common.
<i>Anchocelis lunosa.</i>	Occasional.
<i>Anchocelis litura.</i>	Common.
<i>Cerastis vaccinii.</i>	Occasional.
<i>Cerastis spadicea.</i>	Common.
<i>Scopelosoma satellitia.</i>	Occasional.
<i>Xanthia cerago.</i>	Occasional.
<i>Xanthia silago.</i>	Occasional.
<i>Xanthia gilvago.</i>	Beverley, Hull.
<i>Xanthia ferruginea.</i>	Common in some seasons.
<i>Cirrhædia xerampelina.</i>	Occasional.
<i>Cosmia trapezina.</i>	Larvæ common.
<i>Cosmia diffinis.</i>	Occasional.
<i>Cosmia affinis.</i>	Beverley.
* <i>Dicycla oo.</i>	Beverley.
<i>Dianthæcia capsincola.</i>	Common.
<i>Dianthæcia cucubali.</i>	One at Cottingham, 1880.
* <i>Dianthæcia conspersa.</i>	Hull.
<i>Hecatera serena.</i>	One at Springhead. Mr. Dobree says it occurs at Beverley, but is scarce.
<i>Polia chi.</i>	One, Springhead Road, 1880.
<i>Polia flavocincta.</i>	Common, but local.
<i>Dasympolia templi.</i>	Neptune Street, October, 1894.
<i>Microlia ayastula.</i>	Common.
<i>Agriopis aprilina.</i>	A few at Springhead.
<i>Polyommatus attilia.</i>	Common.
<i>Euplexia lucipara.</i>	Common.
<i>Urticaria crenulata.</i>	Beverley.
<i>Urticaria scutellata.</i>	A few seen in Park Avenue, 1880, and 1881, but none since.
<i>Lacerta viridis.</i>	Beverley.
<i>Latona laeta.</i>	Occasional.

<i>Hadena protea.</i>	Occasional.
* <i>Hadena glauca.</i>	Hull.
<i>Hadena dentina.</i>	Occasional.
<i>Hadena chenopodii.</i>	One at Anlaby, 1894.
<i>Hadena suasa.</i>	Common on West Humber Bank.
<i>Hadena oleracea.</i>	Very common.
<i>Hadena pisi.</i>	Occasional.
<i>Hadena thalassina.</i>	Occasional.
* <i>Xylocampa lithoriza.</i>	Beverley.
<i>Calocampa vetusta.</i>	Occasional.
<i>Calocampa exoleta.</i>	Occasional.
<i>Cucullia verbasci.</i>	Larvæ common.
<i>Cucullia chamomillæ.</i>	Beverley.
<i>Cucullia umbratica.</i>	Occasional.
* <i>Heliothis peligera.</i>	Hull.
<i>Heliothis marginata.</i>	Holderness.
<i>Anarta myrtilli.</i>	Beverley.
<i>Heliothis arbuti.</i>	One, Springhead, 1897.
<i>Brephos parthenias.</i>	Beverley, in Houghton Woods, <i>The Naturalist</i> , April, 1882, p. 151.
<i>Abrostola urticæ.</i>	Occasional.
<i>Abrostola triplasia.</i>	Occasional.
<i>Plusia chrysitis.</i>	Common.
<i>Plusia festucæ.</i>	Beverley.
<i>Plusia iota.</i>	Common.
<i>Plusia V-aureum.</i>	Common.
<i>Plusia gamma.</i>	Common.
<i>Gonoptera libatrix.</i>	Common.
<i>Amphipyra tragopogonis.</i>	Common.
<i>Mania typica.</i>	Hull.
<i>Mania maura.</i>	Occasional.
* <i>Toxocampa pastinum.</i>	Hull.
* <i>Catocala fraxini.</i>	Hull.
<i>Euclidia mi.</i>	Kelsey Hill, occasional.
Geometræ.	
<i>Ourapteryx sambucata.</i>	Common.
<i>Epione vespertaria.</i>	Said to have occurred at Hunsley, near Beverley, about 1858. <i>The Naturalist</i> , April, 1882.
<i>Epione apiciaria.</i>	Occasional.
<i>Rumia crataegata.</i>	Very common.
<i>Metrocampa margaritata.</i>	Common.
<i>Eurymene dolobraria.</i>	Occasional.
<i>Selenia illunaria.</i>	Common.
<i>Selenia lunaria.</i>	Occasional.
<i>Himera pennaria.</i>	Rare.
<i>Odontopera bidentata.</i>	Common.
<i>Crocallis elinguaria.</i>	Common.
<i>Ennomos almaria(tiliaria)</i>	Occasional.
<i>Ennomos fuscantaria.</i>	Occasional.

<i>Lamia comptula.</i>	Occasional.
<i>Phigalia pilosaria.</i>	Common.
<i>Amphydasis prodromaria.</i>	One in Park Street, 1895.
† <i>Amphydasis betularia.</i>	Occasional.
<i>Hemerophila abruptaria.</i>	Occasional.
<i>Boarmia repandata.</i>	Occasional.
<i>Boarmia rhomboidaria.</i>	Common.
<i>Tephrosia biundularia.</i>	Occasional.
<i>Boletobia fuliginaria.</i>	A specimen of this rarity was taken at midnight at the end of August, 1896, in Messrs. Earle & Co.'s Shipbuilding Yard at Hull, was exhibited by Mr. J. W. Boult at a meeting of the Hull Scientific and Naturalists' Club, October 14th, 1896 (List of Yorkshire Lepidoptera, Supplement, p. 205).
<i>Iodis lactearia.</i>	Willerby Lane.
<i>Hemithaea tiviniaria.</i>	Occasional.
<i>Acidalia scutulata.</i>	Common.
<i>Acidalia bisetata.</i>	Occasional.
<i>Acidalia diversata.</i>	Common.
<i>Acidalia emarginata.</i>	Hornsea, <i>Trans. Naturalist.</i> , VI., 1895.
<i>Timandra amataria.</i>	Common.
<i>Cainia pastoralis.</i>	Occasional.
<i>Cabera exanthemaria.</i>	Common.
<i>Halia wavaria.</i>	Common.
<i>Panagra petraria.</i>	East Park, 1895.
<i>Abraxas grossulariata.</i>	Common.
<i>Abraxas ulmata.</i>	Hessle. One, Beverley Road.
<i>Lomaspilis marginata.</i>	East Park, 1899.
<i>Hybernia rupicapraria.</i>	Common.
<i>Hybernia leucophæaria.</i>	One at Anlaby, 1895. Common at Beverley.
<i>Hybernia progenimaria.</i>	Common.
<i>Hybernia defoliaria.</i>	Common.
<i>Leucania obsoleta.</i>	Common.
<i>Chionodes litoralis.</i>	Common.
<i>Oporabia dilutata.</i>	Common.
<i>Larentia didymata.</i>	Common.
<i>Larentia pectinitaria.</i>	Occasional.
<i>Larentia albidula.</i>	Common near Holderness Road.
<i>Larentia decolorata.</i>	Occasional.
<i>Lepidochorina cestinalis.</i>	Occasional.
<i>Eupithecia lariciata.</i>	Brentingham.
<i>Eupithecia extensaria.</i>	" Our county has produced the only two specimens of this species which

† This moth was formerly called *Doubledayaria*, but in recent years nearly all the specimens caught in this district have been the black variety *Doubledayaria*.

have yet been taken in Britain. Mr. W. Prest detected a specimen in the boxes of Mr. Buck, who took it on *Artemisia* at Spurn about 1870. The other specimen was taken on waste ground near Hull in June, 1873, by Mr. Sawyer, and is now, I believe, in the collection of Mr. Philip B. Mason, F.L.S., of Burton-on-Trent."

Formerly common at end of Alexandra Dock. The place is now destroyed.

Common.

Occasional.

One at Stoneferry, 1892.

Common.

Cottingham.

Common.

Very common.

Very common.

Common.

One, Cottingham Road. Willerby Lane.

Common.

Occasional.

Very common.

One, Cottingham, 1886.

Two, Anlaby, 1894.

Occasional.

Common.

Common.

Common in some gardens.

Occasional.

Common.

Formerly common at the end of Alexandra Dock, now extinct there, but occurs at West end of town.

Brough.

Common.

Occasional at Kelsey pits.

Two, Cottingham Road, 1889.

Drepanulæ.

Common.

Pseudo-Bombyces.

Occasional.

Occasional.

Common.

Very common.

Occasional.

Eupithecia subnotata.

Eupithecia vulgata.

Eupithecia rectangulata.

Thera variata.

Hypsipetes elutata.

Melanthisia ocellata.

Melanippe subtristata.

Melanippe montanata.

Melanippe fluctuata.

Anticlea badiata.

Anticlea derivata.

Coremia ferrugata.

Coremia unidentaria.

Campogramma bilineata.

Scotosia dubitata.

Cidaria miata.

Cidaria russata.

Cidaria immanata.

Cidaria suffumata.

Cidaria prunata.

Cidaria testata.

Cidaria fulvata.

Pelurga comitata.

Eubolia cervinaria.

Eubolia mensuraria.

Anaitis plagiata.

Tanagra chærophyllata.

Cilix spinula.

Dicranura furcula.

Dicranura bifida.

Dicranura vinula.

Pygæra bucephala.

Ptilodonis palpina.

<i>Notodonta camelina.</i>	Occasional.
<i>Notodonta dicta.</i>	Occasional.
<i>Notodonta ziczac.</i>	Occasional.
<i>Diloba cæruleocephala.</i>	Common.
	<i>Deltoides.</i>
<i>Hypena proboscidalis.</i>	Very common.
PYRALIDES.	
<i>Aglossa pinguinalis.</i>	<i>Tortrix ministrana.</i>
<i>Pyralis glaucinalis.</i>	<i>Tortrix forsterana.</i>
<i>Pyralis farinalis.</i>	<i>Peronea variegana.</i>
<i>Scopula lutealis.</i>	<i>Peronea hastiana.</i>
<i>Scopula olivalis.</i>	<i>Penthina betulætana.</i>
<i>Scopula prunalis.</i>	<i>Penthina capræana.</i>
<i>Botys (flavalis) urticae.</i>	<i>Pardia triplunctata.</i>
<i>Botys ruralis.</i>	<i>Euchromia mygindana.</i>
<i>Ebulea crocealis.</i>	<i>Sphaleroptera ictericana.</i>
<i>Ebulea stachydalis.</i>	<i>Pædisca corticana.</i>
<i>Spilodes sticticalis.</i>	<i>Ephippiphora pflugiana.</i>
<i>Pionea forficalis.</i>	<i>Ephippiphora brunniichiana.</i>
<i>Cataclysta lemnialis.</i>	<i>Symæthis oxyacanthella.</i>
<i>Hydrocampus nymphæalis.</i>	<i>Xanthorhoe varians.</i>
<i>Hydrocampus stagnalis.</i>	<i>Argyrolepis hartmanniana.</i>
	<i>Aphelia osseana.</i>
PTEROPHORI.	
<i>Pterophorus monodactylus.</i>	TINEÆ.
<i>Alucita hexadactyla.</i>	<i>Diurnea fagella.</i>
CRAMBI.	
<i>Crambus pratellus.</i>	<i>Tinea tapetzella.</i>
<i>Crambus pascuellus.</i>	<i>Tinea dubiella.</i>
<i>Crambus tristellus.</i>	<i>Tineola biselliella</i>
<i>Crambus culmellus.</i>	<i>Adela cuprella.</i>
TORTRICES.	
<i>Tortrix podana.</i>	<i>Hyponomeuta cagnagellus.</i>
<i>Tortrix iratægana.</i>	<i>Depressaria galatella.</i>
<i>Tortrix ribeana.</i>	<i>Depressaria assimilella.</i>
<i>Tortrix corylana.</i>	<i>Depressaria angelicella.</i>
<i>Tortrix viridana.</i>	<i>Depressaria heracliana.</i>
	<i>Dasyptera sulphurella.</i>
	<i>Œcophora pseudospretella.</i>
	<i>Argyresthia chloripilla.</i>
	<i>Argyresthia gædartella.</i>

DIPTERA OF EAST YORKSHIRE

By W. J. FORDHAM, M.R.C.S., D.P.H., F.E.S.

UNTIL recent years, practically nothing has been done towards the study of this order in the East Riding, and the following account is therefore necessarily sketchy. The number of dipterists in the British Isles is comparatively small, and this fact, together with the absence of a complete work on the subject in English, renders it difficult to ascertain whether many species are generally distributed in suitable localities, or whether their distribution is rare or local in the country as a whole.

As far as the East Riding is concerned, it is probable that when the vice-county has been thoroughly worked, it will be found to be exceptionally rich in those groups, at least, which require aquatic or marshy conditions, e.g., *Chironomidæ*, *Tipulidæ*, *Ptychop-teridæ*, *Culicidæ*, *Stratiomyidæ* and *Dolichopodidæ*, to mention a few.

Of insects which frequent sandy places, some interesting species have already been recorded, both from Spurn Point and the coast line, and from the sandy commons in the Riding. To these may be added the large bulk of flies which pass their larval and pupal states in the ground, and which occur in pastures, arable land and woodlands, and should therefore prove to be well distributed in the area.

At present between three and four hundred species are known to occur in the Riding, and this total is made up of flies from barely a dozen localities, and, therefore, is anything but exhaustive, and contains very few insects belonging to the more difficult groups.

The list of *Cecidomyidae* or gall flies includes the commoner species of *Perrisia*, which are apparently well distributed, together with *Perrisia acrophila* Winn, *P. plicatrix* Lw. and *Mikiola fagi* Htg., from Danes' Dyke, near Bridlington. *P. lathyri* Kief. at Bempton, *Contarinia steinii* Karst at Sewerby, and *P. sisymbrii* Schr., and *P. thaliatri* Traill from Bubwith. The Hessian Fly (*Cecidomyia destructor* Say.) has been taken near Hull, at Hornsea and in Welton Dale.

The *Mycetophilidae* should not be uncommon. *Mycetophila cingulum* Mg. has been taken abundantly near Barmby Moor. Several species of *Bibionidae* occur, and *Bibio marci* L. is occasionally exceptionally abundant in the lower Derwent Valley.

Simulium maculatum Mg. occurs on Allerthorpe Common. Other species should occur.

The *Culicidae* are well represented by *Anopheles maculipennis* Mg. (in numbers at Bubwith, hibernating in cowsheds in the winter, and also at Buckton, Flamborough, Filey and East Heslerton). *A. bifurcatus* L. (Hertford, Muston and Filey), *Theobaldia annulata* Schr., *Culex morsitans* Theob., and *Ochlerotatus nemorosus* Mg. on Skipwith and Allerthorpe Commons. *Culex pipiens* L., and the maritime *O. detritus* Hal., at Spurn. Several species of *Ptychoptera* occur, of which the most interesting is *P. minuta* Tourn. from Hornsea. This species has only recently been added to the British List.

QUEEN'S DOCK, HULL.



Among the *Limnobiidae* may be mentioned *Molophilus armatus* Meij. from Skipwith (another recent British addition), and *Erioptera trivialis* Mg., *E. fuscipennis* Mg., *Ephelia marmorata* Mg. (noted dancing in groups of 6-12 individuals, about 9-30 p.m., over a small stream), *Limnophila linceolella* Verr. and *L. discicollis* Mg. from Beverley, and *Amalopis immaculata* Mg. from Hornsea.

Of the *Tipulidæ*, the handsome *Pachyrrhina crocata* L. occurs at Bubwith, and *P. scurra* Mg. on Skipwith Common. *P. imperialis* Mg. and *P. histrio* F. have been taken at Beverley. Several species of *Tipula* are found in the Riding, including *variipennis* Mg., *scripta* Mg., *lateralis* Mg. and *lutescens* F. The "leather jacket" grubs of *Tipula oleracea* L. are all too numerous for the farmers in the district. The handsome, large species of *Stratiomys* have not occurred, but several of the smaller members of the family have been taken in the neighbourhood of water. *Nemotelus uliginosus* L. is not uncommon on brackish ditch sides at Spurn. *Chloromyia formosa* Scop., *Oxycera trilineata* F., and *Odontomyia viridula* F. occur in the Derwent Valley, where also may be taken the prettily coloured *Chrysonotus bipunctatus* Scop., together with several species of *Sargus* and *Beris*, and all three British species of *Microchrysa*.

Of the blood-sucking *Tabanidæ*, the commonest species is "The Cleg," *Hæmatopota pluvialis* L. Its congener, *H. crassicornis* Whlbg., is not uncommon in Derwentland, where the writer has found the male as frequent as the female. (This does not occur with the common species, where the male is very rarely taken, possibly owing to the habit of most male Tabanids of flying at a considerable altitude, and so

(escaping notice). *Crassicornis* has also been taken at Spurn. The large gaddies have so far escaped notice, but *Thecioplectes tropicus* Mg. and *T. distinguendus* occur in the Bubwith district. *Chrysops relicta* Mg. is to be taken at Spurn.

Several species in the family *Leptidae* occur commonly. The interesting *Asilidae*, or "Robber Flies" have a few representatives in the district. *Dioclea rufipes* Deg. is not uncommon in marshy places, and *D. baumhaueri* Mg. occurs on Allerthorpe Common, where also occur *Lasiopogon cinctus* F. (not uncommonly, but difficult to capture, and very inconspicuous), and *Dysmachus trigonus* Mg. *Philonicus albiceps* Mg. occurs on the sand dunes at Spurn, in company with *Thereva annulata* F. and *T. bipunctata* Mg., and *Aethra paniscus* Rossi. The handsome *Neotilamus cyanurus* Loew. has been taken in one or two places in Derwentland, resting on leaves at the edge of woods, and preying on small flies.

The *Empidae* of the Riding include *Hybos culiciformis*, *Rhamphomyia nigripes* F., *sulcata* Fln., and *variabilis* Fln., *Empis tessellata* F. (very abundant), *livida* T., *sterecea* L. and *punctata* Mg., *Ocydromia glabricula* Fln., *Clinocera stagnalis* Hal., and the little *Tachypetza nubila* Mg. (which latter insect is always ready for a game of "hide and seek" round tree trunks at Melbourne, where it is not uncommon).

The headquarters of the family *Dolichopodidae* are at present in the lower Derwent Valley near Bubwith, and here have been taken the uncommon *Eutarsus aulicus* Mg., *Dolichopus griseipennis* Stan., *D. festivus* Hal., *D. trivialis* Hal., *D. leucipennis* Mg., *D. pennatus* Mg., *D. longicornis* Stan. (an uncommon species), *D. acutus* Deg., *D. plumipes* Scop., the curious *Pacilodes*

bostrus nobilitatus L., *Hercostomus nigripennis* Fln., *Argyra leucocephala* Mg., *Porphyrops nasuta* Fall., a rare species with very few British records; *Scellus notatus* F., *Hydrophorus nebulosus* Fln. (frequent on Allerthorpe Common on dried-up pools), *Campsicnemus scambus* Fln. and *curvipes* Fln. In the *Platypedidae*, the attractive little *Callimyia amæna* Mg. has been taken at Bubwith and in the genus *Pipunculus* occur *zonatus* Zett. (Bubwith), *campestris* Ltr. (Bubwith and Beverley), and *nigritulus* Zett. (Spurn).

The *Syrphidae*, as usual, have come in for a fair amount of attention, about fifty species having been noted in the Riding, including *Pipizella virens* F., *Chilosia scutellata* Fln., *C. pulchripes* Lw., *C. illustrata* Harr., *C. fraterna* Mg., *C. vernalis* Fln., five species of *Platychirus* (*scambus* Stæg. at Allerthorpe, and *immarginatus* Zett. at Spurn and Skipwith). *Leucozona lucorum* L., very common and variable on umbellifers by the River Derwent. *Catabomba selenitica* Mg., many species of *Syrphus* (*compositarum* Verr. at Skipwith and Bubwith, *lasiophthalmus* Zett., Beverley, and *arcticus* Zett. Allerthorpe), *Baccha elongata* F., *Ascia podagraria* F., and *dispar* Mg., both at Beverley, *Volucella bombylans* L. and *pellucens* L., *Eristalis horticola* Dg., *Helophilus hybridus* Lw. (Allerthorpe) and *lineatus* F. (Bubwith), and *Chrysotoxum bicinctum* L. (Bubwith).

Of the *Conopidae* may be mentioned *Conops flavipes* L. (parasitic on larvæ of wasps), and *Sicus ferrugineus* L. from Skipwith Common, and *Myopa testacea* L., and *polystigma* Rnd., preying on small flies on the umbellifers which crowd the towing path by the river at Bubwith.

Though "warbles" are not uncommon in cattle,

the adult fly (*Hypoderma*) has so far escaped notice, and the same may be said of the "Horse Bot" and the "Sheep Fly."

Among the *Tachinidae*, very few species have been noted. *Echinomyia grossa* L. occurs on Skipwith Common, where it is parasitic on the Fox Moth larva, and here also *Micropalpus vulpinus* Fln. is commonly taken flying over the heather.

Cynomyia mortuorum T. (a species known to breed in dead dogs) has been found at Spurn together with *Sarcophaga melanura* Mg.

The *Muscidae* call for little comment. As to be expected in an agricultural district, *Stomoxys calcitrans* L. is abundant, and a vicious biter. *Pollenia rufa* F. is often found swarming during its winter hibernation in farm houses.

Few of the difficult family *Anthomyidae* have been determined. The attractively spotted *Anthomyia plurialis* L. occurs, and among others may be mentioned *Chortophila cinerella* Fln., *Phorbia seneciella* Meade, *Pegomyia betae* Curt., and *bicolor* W., *Caricea tigrina* F., and *Lispe tentaculata* Deg., and *uliginosa* Fln. Various species of *Scatophaga* are abundant, and other representatives of the *Cordyluridae* are *Cordylura pubera* F. (common at times on umbellifers by the Derwent), and *C. ciliata* Mg. (Beverley). Of the remaining families of *Acalyptates*, many of the species of which are found in damp places, we have (mainly from Beverley or the Derwent Valley), *Helomyza pectoralis* Lw. and *lacifrons* Lw., *Lucina fasciata* Mg., *Edoparea bicincta* Fln., *Sciomyza cinerella* Fln., *S. simplex* Fln., five species of *Tetanocera* and three each of *Limnia* and *Elgiva* and *Croceys crassipennis* F. Among the "bar-wing" flies should be mentioned

Trypetia florescentiae L., *Vrophora solstitialis* L. and *Tephritis miliaria* Schr. from Bubwith, *T. vespertina* Lw., and *Euaresta conjuncta* Lw. from Allerthorpe Common, and the charming little *Urellia stellata* Fuessl. from Skipwith.

The attractively marked *Toxoneura muliebris* Harr. occurs at Bubwith, where also may be taken *Lauxania ænea* Fln. (whose larva is said to feed in the stem of the wild field pansy), and several *Sapromyzids* and *Opomyzids*.

Of the semi-aquatic *Ephydridæ*, *Notiphila nigricornis* Stnh., *riparia* Mg. and *cinerea* Fln. are on record for the Riding, together with *Parhydra 4-punctata* Mg., *aquila* Fln. and *coarctata* Fln. *Drosophila fenes-trarum* Fln. has been taken at Allerthorpe. The *Chloropids* *Meromyza lœta* Mg., and *Chlorops tæniopus* Mg. (the well-known corn pest) complete our list of East Riding flies, and of the numerous species of *Agromyzidæ*, *Phytomyzidæ*, *Borboridæ* and *Phoridae*, which are certain to occur in the area, at present our knowledge is scanty. Further details of the occurrence of species of Diptera in the East Riding may be found in the "Victoria County History of Yorkshire," and the pages of *The Naturalist*, in which latter are numerous articles by Mr. Cheetham, to whom the writer is greatly indebted for help in compiling this brief account.

HYMENOPTERA OF EAST YORKSHIRE

By W. J. FORDHAM, M.R.C.S., D.P.H., F.E.S.

COMPARATIVELY little is known of the Hymenopterous fauna of the East Riding. This is to be regretted, as the area is probably rich in the order if the variety of habitats, and the species already discovered by more or less casual work are any indication. The "Victoria History" gives 582 species for the county as a whole, out of a total British list of 4036, as then known. This is an extremely meagre proportion. Only 17 species are specifically recorded therein from East Yorkshire, of which one is the Hive Bee! The question of identification is a drawback to the study of these insects, as it is very difficult, except for an expert, correctly to place many of the species. In the following notes, mention only is made of those species which have been submitted to authorities in the various sub-orders.

Among the Aculeates many interesting species occur. The introduced Ant, *Monomorium pharaonis* L. has been found in houses at Hull, and the alien *Camponotus herculeanus* is recorded from the docks. The little *Leptothorax acerorum* F. occurs on Skipwith Common, where it may be found in colonies under bark of birch stumps.

Many of the Fossors are found in the Riding, especially in sandy districts. Spurn Point has yielded

Ammophila sabulosa L., which also occurs on Allerthorpe Common, and *Pompilus plumbeus* F., and many other species will, no doubt, occur there.

Allerthorpe Common produces several species of *Crabro*, together with *Pompilus viaticus* L., *Salius exaltatus* F., *Mimesa bicolor* Jur., *Gorytes mystaceus* L., *Mellinus arvensis* L. and *Oxybelus uniglumis* L. Unfortunately, this tract of virgin common land has suffered severely from an extensive fire, which took place last year. Yet there are many parts on the outskirts of the Common which have escaped, and which yield many of the more interesting insects. The Common is sufficiently varied to prove attractive to many Hymenoptera, and comprises areas of heather, cotton grass bog, birch scrub, and more or less bare sandy patches, with bracken. The whole is surrounded by arable and pasture land, with a fair sprinkling of conifers and deciduous trees, and is one of the best collecting grounds for all orders of insects in the Riding. Skipwith Common is an equally attractive expanse of unenclosed moorland, but is comparatively more peaty and water-logged, and in normal times much of the area is marshland with pools frequented by various wild fowl, and providing nesting sites for innumerable Black-headed Gulls. At Bubwith, *Crabro dimidiatus* F. has been taken abundantly near the River Derwent, and several other species of the genus have occurred together with *Diodontus luperus* Schenk., *Psen pallipes* Pz., *Pemphredon lugubris* F., and *Trypoxylion figulus* L. The Hornet (*Vespa crabro* L.) reaches its most northerly limit in Yorkshire, and has been taken at Beverley, together with *Vespa austriaca* Pz. All our seven British species of *Vespa* occur in the Riding, and the nest of *V. norvegica* F. has been

found suspended from a currant bush at Bubwith, at which place the Solitary Wasps are abundant, especially *Odynerus parietinus* L., together with *parictum* L., *sinuatus* F., and *Z. fasciatus* Ol.

The Anthophila are well represented in the district. Many species of *Andrena*, including *Chrysocles* Kirb., *nigroanca* Kirb., *heleola* L., *nana* Kirb., and *wilkella* Kirb., may be taken on the banks of the Derwent at Bubwith, and Skipwith Common produces *Halictus rubicundus* Chr. in extreme abundance, *H. atricornis* Sm., *Colletes daviesana* Sm. (also occurring on pansy at Bubwith), *C. succinctus* L., *Andrena gwynana* Kirb., *Nomada bipila* Th., *N. succincta* Pz., *Sphexcodes pilifrons* Th., and *S. ferruginatus* Schr. At Bubwith also occur *Prosopis communis* Kirb. (commonly), several species of *Halictus* and *Nomada*, *Osmia rufa* L., *Leptana* Kirb., and *aurulenta* Pz., and all the common Humble Bees.

Allerthorpe Common produces many of the above-mentioned Bees, together with *Andrena clarkella* Kirb., to be dug out of its burrows in the sandy paths in early spring in fine condition; *A. coitana* Kirb., *Halictus freyessneri* Altk., *H. cylindricus* F. and *Sphexcodes similis* Wesm. From Cottingham, near Hull, *Andrena nigroanca* Kirb. is recorded. Of the Chrysididae only two species have been taken—the common *Chrysis ignita* L., and the pretty little *Notoceras panzeri* F., which occurs on Skipwith Common, and last year was discovered in extreme abundance in one limited sandy part of Allerthorpe Common flying over bracken. Practically all our records of the family Ichneumonidae come from the neighbourhood of Bubwith and Skipwith, but *Sagaritis laevicollis* Holm. was taken many years ago near Hull by the late Peter

Inchbald. The Rev. C. D. Ash has bred *Mesochorus tetricus* Hlmg. hyperparasitic on *Apanteles octonarius* Ratz. from *Notodonta dromedarius* at Skipwith. Other interesting ichneumon flies from the Derwent Valley. include *Melanichneumon faunus* Grav., a very rare species, *Ichneumon gradarius* Wesm. (a parasite of the destructive Antler Moth, and also bred from *Trachea piniperda*), *Amblyteles negatorius* F., *Phæogenes bellicornis* Wesm., *Proclitus socius* Hal., *Dicælotus cameroni* Bridg., *Hemiteles brunneus* Morl., *Glypticnemis sulfociensis* Morl., *Atractodes bicolor* Gr., *Pimpla arctica* Zett., *Polyphincta gracilis* Hlgr., a rare species parasitic on spiders, *Exetastes guttatorius* Gr. (not previously found so far north), *Homocidus pectoratorius* Gr. (probably parasitic on *Syrphus*) *H. biguttatus* Gr., (distinctly uncommon in Britain), *Mesoleius aulicus* Gr. bred from Sawfly cocoons from Skipwith Common together with another species of *Mesoleius* bred from *Lophyrus pini* L., numerous species of *Tryphoninæ*, which are abundant on umbellifers by the Derwent, including *vulgaris* Hlgr., *consobrinus* Hlgr. (not previously north of Notts. and Lincs.), *rutilator* L. and *brunneiventris* Gr. *Euryproctus lateralis* Gr., a species with few British records, *Prionopoda stictica* F. (rare in England), *Phobocampa obscurella* Hlgr., and *Ophion stigmaticus* Morl., to mention only a few of the less common species taken in this corner of the Riding out of a total of over 100 species of Ichneumonidæ taken casually.

Few *Braconidæ* are on record. *Meteorus deceptor* Wesm. has occurred at Escrick, and Mr. Ash has bred several *Bracon mediator* Nees. from a single cocoon of *Sesia bembeciformis* at Skipwith. Of the little known *Proctotrypidæ*, two or three species have been taken

at Bubwith, including *Proctotrypes aculeator* Hal., several, not a very common species, usually parasitic on a fungus gnat (*Mycetophila*), *P. curtipennis* Hal., a rare species with only three previous British specimens extant, and *P. gravidator* L.

Few Chalcids have been observed in the Riding, the most interesting being the brilliant *Lamprotatus splendens* West. Gall flies (*Cynipidae*) are probably abundant, and the commoner species are apparently generally distributed. Mr. Falconer records *Aulax papaveris* Perr. from Bridlington, and *Xestophanes potentillae* Retz. from the East Riding bank of the Ouse near Selby.

Of the Sawflies (*Tenthredinidae*), few are recorded. *Dolerus picipes* Kl. and *Pachynematus apicalis* Htg., occur on the cliffs at Bempton : *Cimbex connata* Schr. has been taken at Heslington, and *Strongylogaster cingulatus* F. at Hull. *Sirex gigas* L. and *noctilio* F. have been taken occasionally in various parts of the Riding, and have both occurred in a wood near Bubwith, where an extremely small example of the latter species has been taken.

In the Derwent Valley, from 40 to 50 species have been noted. On Skipwith Common, the larvae of *Lophyrus pini* L. are occasionally abundant on pine, and the perfect insects of *Cimbex femorata* L. and *Trichiosoma lucorum* L. occurs on birch. Here also occur *Entedonota pumilus* Kl., *Dolerus malidius* Kl., with several other species of the genus, commonly on heather; *Pamphilus cater* L., a rare species with few records, *Arge ustulata* L., and *Tenthredella baltica* Kl., the larva of which latter species feeds on the bracken.

Numerous Sawflies occur on the umbellifers by the

banks of the Derwent, including 4-5 species of *Tenthredella*, 4 species of *Tenthredopsis*, 7 species of *Dolerus*, including the rare *dubius* Kl., *Arge cyaneo-crocea* Forst., *Pachyprotasis variegata* Kl., a rarely taken species, *Allantus vespa* Retz., and a host of commoner species.

The rare *Thrinax macula* Kl. has been taken at Bubwith.

ARACHNIDA OF EAST YORKSHIRE

By W. FALCONER, F.E.S.

I.—SPIDERS.

THERE is so much diversity of structure and modes of life amongst spiders, the one adapted to the other, that, whatever the situation may be, some one or other of them is fitted to occupy it. While some are so specialised in these respects as to be restricted to a special habitat, outside which it would be useless to search for them, others are less particular and are equally at home in a variety of situations. In this connection it is well to remember that spiders, in the process of evolution, have developed along two main lines, acquiring, in doing so, the instinct and capacity either (*a*) to make and use snares, or (*b*) to dispense with them and hunt prey freely on the ground and on plants. The same diversity obliges them to scatter to find the requisite conditions, thus broadcasting them over a district, which, as every vacancy can be filled, is in a position, if the need arises, to support the maximum number of species and individuals. No part of it, therefore, can be without its appropriate contingent, not even excepting towns, for their buildings (inside and out), gardens and parks harbour a large number, but generally speaking, however, the more intense the cultivation, the fewer and more thinly diffused are the spiders.

Yet even in the highly tilled Derwentland and Holderness there still remains a considerable number of waste lands, waste, that is, from the point of view of the agriculturist, such as (a) woods, Houghton Woods and Birkhill Wood, etc.; (b) commons and moors as yet untouched with much of their primeval fauna, at Allerthorpe, Pocklington, Skipwith, Barmby, Houghton, etc.; (c) marshes, on the sites of the old meres or near the springs which gush out from the base of the dry Wolds, Pulfyn Bog, Roos Bog, King's Mill Marsh, etc., and low-lying wet ground by the rivers, carrs and ings. It is in these localities that spiders most do congregate, not merely as being refuges to which they have been driven to escape extinction, but also as being most congenial to their tastes and prolific in the insects upon which they feed.

The Humber and its tidal affluents have also their peculiar integers, *Cicurina cinerea*, *Halorates reprobus*, *Erigone longipalpis*, *Cnephalocotes curtus*, *Lycosa purbeckensis*, etc., and the dunes in the extreme south-west of the division contain forms *Prosthesima electa*, *Protadia subnigra*, *Clubiona subtilis*, *Hyctia nivoyi*, etc., which occur in no other part of Yorkshire. Taken together, the areas mentioned above provide some of the best collecting grounds in the county.

The coast on the sea side is not productive, the clay cliffs being constantly eroded, so that few spiders can maintain a foothold there, *Trochosa picta* being most commonly met with in sandy places. Again, there are no great elevations in the Riding (the highest being under 800 feet), with the result that its araneidal fauna is short of the alpine and sub-alpine species, which need not here be named, and which

have been noted about the Pennines. The deficiency in these faunistic groups is somewhat counterbalanced by the presence of certain southerners, which have, in advancing northwards, found a congenial resting place in the division, or, what is also possible, in some cases, been left stranded as survivals of a more generally diffused ancient fauna, e.g., *Cercidia prominens*, *Pirata piscatoria*, *Clubiona subtilis*, *Hyctia nivoyi*, *Euophrys aequipes*, etc. This leads to the consideration that the spider population in any district is never at any time stable or a "closed" association. There are both losses and gains. The former are largely due to human activities in building and excavating works of various kinds, and in draining swamps, and bringing waste lands under cultivation, as is being constantly done in the East Riding. These operations produce their effect as much by diminishing the size of their favourite haunts as by the actual destruction of individuals and species—(not to mention the devastating fires which sometimes occur). The gains accrue mainly through commercial channels, as, for instance, *Erigone spinosa*, *Hasarius adansonii* and *Theridion tepidariorum*, or the natural means of dispersal at their command. Such additions pass unnoticed.

The total number of species met with in the Riding, up to the present time, is 242 out of 322 recorded for the county. The southern half, being most accessible to the Hull field naturalists, has been the most thoroughly searched, and the portion north and north-west of the Wolds, the least. The time of the meeting, however, being between seasons, there will be a considerable quantity of immature, and for that reason mostly indeterminable examples,

while adult males, their season over, will probably be scarce.

There is far too much material to be compressed into the space at disposal, but anyone further interested in the subject can obtain full information on any point from the following articles in *The Naturalist* :—Four papers by the writer, (1) “*Cornicularia kochii* Cb. and the British Corniculariæ,” August and September, 1909; (2) “Keys to the Families and Genera of British Spiders and to the Families, Genera and Species of British Harvestmen and Falsescorpions,” revised, reprinted and published separately, February, 1911, from the journal of 1910; (3) “On the Origin of the Araneidal Fauna of Yorkshire,” February and March, 1913; (4) “The Spiders of Yorkshire, with the county, British and foreign distributional range, season, etc.,” serially from June, 1918; and one by T. Stainforth, “The Distribution of Spiders in the East Riding,” September and December, 1916.

For the reason assigned above, all that can be given in the list below are selections of the more easily recognised forms, arranged in two parts, one containing those which are usually plentiful in suitable situations (in many instances no hard and fast line can be drawn), and the other the more restricted and specialised species.

The divisions employed are:—(1) Hull, and probably other towns; (2) Holderness; (3) The Humber and its Tidal Affluents; (4) The Dune area in the south-east; (5) Hornsea Mere; (6) The Wolds; (7) Derwentland, south of Malton; (8) Derwent Carrs, north and west of the Wolds.

PART I.

A.—BUILDINGS OF ALL KINDS
(cellars, cupboards, windows, etc.).

Drysdera crocota C. L. Koch. About $\frac{1}{2}$ ", 6 eyed, forepart deep red-brown, abdomen pale. Also in gardens and in chalk pits. Div. 1, 2, 3, 9.

Amphinotus similis Bl. $\frac{1}{2}$ ", in genus web bluish when fresh, chalky when old. Dark central patches on fore abdomen clearly separated by a thin pale line, other markings less dusky than in allied species. Div. all except 3. Also in wall crevices.

A. ferox Walck. $\frac{13}{25}$ ", or about walls. Patches very widely separated and other markings black. Much less common. Div. 1 (Hull), 2 (Beverley), 4 (Dunes), 7 (Hotham Carr).

Steatoda bipunctata Linn. $\frac{1}{2}$ ", in barns or near buildings. Abdomen flattish, purplish-brown. Div. all except 4.

Leptophantes leprosus Ohl. $\frac{1}{2}$ ", abdomen high, in family the web a thin horizontal sheet, spider on under surface. Div. 1, 2, 8. A common cellar dweller, probably in all the divisions. Also in the open amongst vegetation.

Tapinocyba subitanea Cb. $\frac{1}{20}$ ", colour brownish, most plentiful amongst chaff in barns, stables, etc.; also in the open. Div. 1, 2, 8; probably in the others as well.

Tegenaria derhamii Scop. $\frac{1}{2}$ ", everywhere, the maker of the dirty webs in neglected corners. Sooty "diamond" markings on abdomen.

B.—WALLS (buildings, outhouses, gardens, etc.).

(a) JUMPING SPIDER Eyes in 3 rows, 1-2-2, square fronted

Salticus scenicus Clerck. $\frac{1}{2}$ ", striped obliquely on each side—the "Zebra" spider. Div. all except 4.

(b) Eyes in 2 rows, 4-4.

Zilla x-notata Clerck. $\frac{1}{4}$ ", angles of buildings, palings, etc., everywhere. Its wheel web with one sector missing. Species of *Leptophantes* (*zimmermannii* Berth., *tenuis* Bl.) and *Segestria senoculata* often in wall crevices.

C.—GREENHOUSES.

Theridion tepidariorum C. L. Koch. Under $\frac{1}{2}$ ", abdomen high and dull coloured. An irregular web in which it hangs up its egg sacs like hams. Div. 1, 2, but probably in other divisions. Set A mostly also.

D.—BUSHES AND LOWER BRANCHES OF TREES.

Dictyna uncinata Thor. $\frac{1}{6}$ ", especially fond of furze. With an extra flat transverse spinner below the ordinary ones. Fore abdomen with a dark central stripe. Div. all except 4 and 5.

Genus *Theridion*, with short, swollen, high abdomen and irregular web.

T. sisyprium Clerck. $\frac{1}{5}$ ", abdomen with two dark brown longitudinal bands crossed by a number of pale narrow lines; fond of holly and furze. Div. 2, 6, 7, 8.

T. pallens Bl. $\frac{1}{5}$ ", on foliage. The male, unlike the female, is dark coloured. Div. 2, 5, 6, 7.

T. varians Hahn. $\frac{1}{7}$ ", mostly on garden shrubs. Div. 1, 5, 6, 8.

Phyllonethis lineata Clerck. About $\frac{1}{5}$ ", wholly pale or greenish-yellow with some black dots. Div. 2 to 8. The var. *redimita* Koch. has two red bands, one on each side of the abdomen; as common as the type.

Linyphia peltata Wid. $\frac{1}{8}$ ", beneath abdomen a pale "horse-shoe" marking. Div. 2, 5, 6, 7, 8; sometimes amongst herbage.

L. triangularis Clerck. $\frac{1}{4}$ ", without the horse-shoe marking, but with a forked dark stripe on thorax. Seizers in triangular formation. Div. 2, 6, 7, 8, probably in the others also.

L. montana Clerck. $\frac{1}{4}$ ", abdomen with a "leaf" marking and legs annulated. Div. all except 1 and 8. These two species are the chief spinners of those innumerable hammock webs on bushes, so conspicuous when laden with dew or rain. *L. clathrata* Sund., much like the last, has no leg annulations; mostly on the ground among herbage.

Tetragnatha solandrii Scop. $\frac{3}{8}$ ", elongated humped abdomen; on trees in woods. Div. 2, 5.

Epeira diademata Clerck. $\frac{1}{2}$ ", the "diadem" spider; a pale cross marking on fore abdomen; everywhere. *Epeira* wheel webs have the central portion filled in.

E. cucurbitina Clerck. $\frac{1}{4}$ ", yellowish-green; near end of abdomen a conspicuous red blotch. Div. 2, 6, 7, 8.

E. patagiata C. L. Koch. $\frac{1}{5}$ ", large triangular yellowish marking on fore abdomen enclosing a brown one of the same shape, but usually of a darker ground colour than the next, which it very much resembles. Div. 2, 3, 7; especially numerous on furze by a pond on Skipwith Common.

E. cornuta Clerck. $\frac{1}{3}$ ", see the last. In various situations, often spins together the heads of heather and grass. Div. 2, 3, 4, 7, 8.

E. quadrata Clerck. $\frac{3}{5}$ ", the largest British *Epeira*, by globular form of abdomen, with 4 large oval conspicuous whitish spots. Div. 4, 6, 7.

Zilla atrica C. L. Koch. $\frac{1}{4}$ ", bright yellow hue, more or less tinged red on side of abdomen; a "leaf" pattern. *Zilla* wheel webs have one sector missing. Div. all except 4 and 5.

Meta segmentata Clerck. $\frac{1}{4}$ ", ubiquitous and very variable in coloration, but thorax always has a "tuning fork"

stripe. In female hind centrals are more separated than front centrals. Wheel web has the central portion vacant when completed. Div. all.

Philodromus auriculus Clerck, and *cospicilis* Walck. $\frac{1}{2}$ ", very active crab walkers, on bushes, especially furze, and often intermingled. No web. Div. in most. Require expert examination to separate.

Clubiona reclusa Cb.* $\frac{1}{2}$ ", with cylindrical spinners, usually darker than most of its congeners and with a network of veins on the thorax. Div. 2, 5, 6, 7, 8.

C. comta C. L. Koch. $\frac{1}{2}$ ", one of the two species with a distinct abdominal pattern. Div. 6, 7; in woods.

F.—BENEATH TREE BARK AND IN FENCE CREVICES.

Imaurobius fenestralis Stroem. $\frac{1}{3}$ ", like *A. similis* (*ante*), but markings darker and fore central patches not separated. Sometimes in buildings. Div. all except 3 and 4.

Harpactes hombergii Scop. $\frac{1}{2}$ ", sometimes amongst moss, etc.; 6 eyed, by black forepart and very narrow elongated clay coloured abdomen; not in quantity. Div. 2, 5, 6.

Segestria senoculata Linn. $\frac{2}{3}$ ", sometimes beneath stones and in wall crevices; 6 eyed, greyish colour and dark diamond markings down middle of abdomen. Div. all except 3 and 4.

Theridion denticulatum Walck. $\frac{1}{8}$ ", or on foliage, by strong contrast between ground colour and pale central dentated band. Div. all except 1 and 4.

Leptophantes minutus Bl. $\frac{1}{6}$ ", or amongst débris; when beneath curled up bark, by size and annulated legs. Div. 5, 6, 7.

Epeira umbratica Clerck. $\frac{1}{2}$ ", by sombre flattened appearance, "leaf" patterned. Div. 2, 5, 6, 7.

Clubiona pallidula Clerck. $\frac{2}{3}$ ", resembles *Clubiona reclusa* Cb., but a little larger. Div. 2, 6, 7.

Salicus cingulatus Panz. $\frac{1}{2}$ ", striped obliquely both sides of abdomen—a jumping spider, square headed; a different situation from *S. scenicus* (*ante*). Div. 5 to 8.

F.—MARSHY PLACES OR NEAR WATER.

Enidia bituberculata Wid. $\frac{1}{8}$ ", by bright reddish-yellow or yellowish-brown, black margined thorax and sternum. Div. all except 1 and 8.

Leptonima punctatum Bl. $\frac{1}{9}$ ", sternum and thorax dark brown with numerous very distinct punctures. Div. 2, 5, 6, 7.

Meta merianae Scop. $\frac{2}{3}$ ", usually darker than *M. segmentata* (*ante*); front and hind central eyes equally separated; damp dark overhanging places. Div. 5, 6, 7. The var.

* *Clubiona*, *Drassus*, *Gnaphosa*, *Prosthesima*, *Micaria*, *Agroeca*, make no snare, only a cellular retreat; hunting in its vicinity.

celata Bl. has a yellowish-white central stripe down its back.

Pachygnatha clerckii Sund. $\frac{3}{4}$ ", seizers large and divergent, thorax warm yellowish-brown with a central and a lateral on each side black marking. Div. 1 to 8.

Tetragnatha ex'ensa Linn. $\frac{3}{4}$ ", by elongated humped abdomen. Div. 2, 3, 8.

Clubionae, abdomen elongated and flattish, and except in two species without an abdominal pattern; some uniform shade of yellow or brown. Spinners cylindrical.

C. grisea L. Koch. $\frac{1}{2}$ ", by dense covering of pale hairs; thorax brown. Div. 3, 4, 6.

C. holosericea Degeer. A little larger than the last, and more reddish-brown. Div. 1 to 8.

Argyroneta aquatica Latr. $\frac{3}{4}$ ", the well-known "water spider," plentiful in brick-ponds about Hull; also in ponds, Skipwith Common. Div. 1, 2, 3, 7.

Pirata piraticus Clerck. $\frac{1}{4}$ ", in wet places, by the two rows of conspicuous white spots down its abdomen. Central eyes of first row twice the size of the lateral ones. Wolf spider. Div. 1 to 8.

G.—COURsing OVER THE GROUND in lanes, fields, parks and gardens.

Wolf spiders, hunters; no web. Eyes in 3 rows, 4-2-2.

Lycosa amentata Clerck. $\frac{1}{2}$ ", legs strongly annulated; thoracic central band strongly enlarged forward. Div. 1 to 8.

L. pullata Clerck. $\frac{1}{4}$ ", legs not annulated, but clouded blackish, band obscure, narrow. Div. 1 to 8. Both species abundant.

H.—ON OR NEAR THE GROUND, among débris and low vegetation, under stones, logs, etc.

Dictyna arundinacea Linn. $\frac{1}{7}$ ", spins up the heads of heather, grass, etc. Div. 2, 7, 8.

Drassus lapidosus Walck.* $\frac{1}{2}$ ", elongated and flattish; hind central eyes pearly white, close together and of irregular shape. Div. 1 to 8.

D. troglodytes C. Koch.* $\frac{1}{3}$ ", similar to last, but somewhat smaller and legs shorter. Div. 4, 7.

Micaria pulicaria Sund.* $\frac{1}{8}$ ", at once by its brilliant metallic tints in reflected light. Div. 3, 4, 7.

Pholcomma gibbum Westr. $\frac{1}{15}$ ", reddish brown, pitted, abdomen nearly circular. Eyes in 3 groups, 3-2-3. Div. 2, 3, 4, 6, 8.

Walckenaera acuminata Bl. $\frac{1}{8}$ ", male with long projection on head swollen in middle where half of its 8 eyes; the female's ocular area also projects prominently. Div. 3, 6, 7.

Savignia frontata Bl. $\frac{1}{12}$ ", male's head conically produced, 2 eyes at the top and 6 curved round the base on the head. Div. all except 4.

- Tapinopa longidens* Wid. $\frac{1}{6}$ ", anterior eyes curved strongly forward and space below them (*clypeus*) narrow. Div. 1, 2, 5, 7.
- Pachygnatha degeerii* Sund. Seizers large and divergent; thorax black-brown, deeply pitted. Div. 1 to 8.
- Tibellus oblongus* Walck. $\frac{2}{3}$ ", long and narrow, dull creamy-yellow, speckled with minute brown spots. Div. 2, 3, 4, 6.
- Xysticus cristatus* Clerck. $\frac{3}{10}$ ", the commonest "crab walker." Four central eyes form a square and the front lateral eyes are the largest of all. Div. 1 to 8. There are two other rarer species.
- Oxyptila trux* Bl. $\frac{1}{6}$ ", a "crab walker," smaller and differently marked, posterior central eyes closer to each other than to laterals. Div. all except 1 and 4. Two other rarer species in the Riding.
- Agroeca proxima* Cb. $\frac{1}{4}$ ", like *Clubiona*, but with a pattern on thorax and abdomen. Div. 2, 4, 7.
- Trochosa terricola* Thor. $\frac{1}{2}$ ", band on fore abdomen not paler; inner margin of fang groove with two teeth. Div. all except 1 and 5.
- T. ruricola* Degeer. $\frac{3}{4}$ ", band paler; inner margin of fang groove with three teeth; live more in colonies than the last. Div. 1 to 7. Wolf spiders
- Tarentula pulchrulenta* Clerck. $\frac{2}{3}$ ", thoracic band wide and parallel sided; abdomen with a clear central band. Div. all except 1 and 8. Male given to wandering. Wolf spider.
- Euphrys frontalis* Walck. $\frac{1}{6}$ ", jumping spider, square headed. Eyes in 3 rows, 4-2-2; yellow-brown, head darker; on abdomen angular markings. Div. 2, 3, 4, 6.

I.—SANDY PLACES, especially on coast.

- Tylochirus scutellatus* Westr. $\frac{1}{4}$ ", anterior eyes curved forward, central eye-space much longer than wide. South of Bridlington. Div. 2.
- Tirellia picta* Hahn. $\frac{1}{3}$ ", the handsomest British wolf spider. Div. 2, 4, 7.

PART II.

Division 1. HULL.

- Attus pulescens* Fabr. $\frac{1}{6}$ ", a dark-coloured jumping spider, in gardens, buildings and greenhouses.
- Hasarius adansonii* Sav. $\frac{1}{4}$ ", a jumping spider, abdomen with a broad reddish band down the middle; hothouses, Pearson Park.

DIVISION 2. HOLDERNESS.

- Onopos fulcher* Templ. $\frac{1}{2}$ ", 6-eyed, uniform brick red, lively. Burton Constable; also Div. 7, Houghton Woods. Beneath stones or among débris.

Scotophaeus blackwallii Thor. $\frac{3}{8}$ ", mouse-coloured, hind central eyes pearly white, angular. In houses, nocturnal. Kelsey Hill. Also Div. 7, Bubwith.

Theridion pictum Hahn. $\frac{15}{16}$ ", abdomen with dark red dentated band down middle, denticulations long and sharp. Bushes (especially furze), Ellerby. Also Div. 7, Skipwith and Riccall Commons, plentiful.

Baryphyma pratensis Bl. $\frac{4}{5}$ ", rare, in damp places. Sutton Drain, Pulfyn Bog (River Hull).

Lycosa palustris Linn. $\frac{4}{5}$ ", a wolf spider, with a narrow central cephalic band. Several places. Also on Wolds; not always in damp places.

L. herbigrada Bl. $\frac{7}{25}$ ", with a very wide constricted central cephalic band. Very rare. Pulfyn Bog.

Ero cambridgii Kulcz. $\frac{1}{8}$ ", distinct by sexual characters from the much commoner *E. furcata* Vill., both by two tiny abdominal bicoloured humps. Roos Bog, 1 male.

Division 3.—HUMBER AND TIDAL AFFLUENTS.

Erigone longipalpis Sund. $\frac{1}{8}$ ", a characteristic spider of this division and common. Genus by marginal teeth on thorax and peculiar structure of male's palps.

E. spinosa Cb. A little smaller than the last. Saltend Common, the only British station. Rare. See *The Naturalist*, 1908, pp. 378-9, for drawings. Scarce.

Cnephalocotes curtus Sim. $\frac{1}{3}$ ", by short squat form; beneath estuarine plants.

Cornicularia kochii Cb. $\frac{1}{16}$ ", drawings and description in *The Naturalist*, August and September, 1909. Also at Hornsea Mere.

Halorates reprobus Cb. $\frac{1}{8}$ ", on the shores of the Humber, Hull, Hessle, Saltend, North Ferriby, Marfleet. A confirmed halophile, shades of yellowish-brown. Eyes subequal.

Cicurina cicur Menge. $\frac{1}{8}$ ", scarce, forepart reddish-yellow, abdomen pale clay yellow; upper spinners much longer than the lower. Saltend and Southfield Pit, Hessle.

Lycosa purbeckensis F. Cb. var. *minor*. $\frac{1}{4}$ ", a plentiful wolf spider on the shore.

Division 4.—DUNE AREA.

Prostheisma latreillei C. L. Koch.* $\frac{1}{8}$ ", by its black appearance. Hind central eyes pearly white, close and angular.

P. electa C. Koch.* $\frac{1}{8}$ ", forepart reddish-brown. Both these and the next rare.

Protadia subnigra Cb. $\frac{1}{11}$ ", like *Dictyna* with an extra flat transverse spinner and eyes in two parallel rows, laterals not touching, but with space below eyes narrower and caput lower.

Erigone arctica White var. *maritima* Kulcz. $\frac{1}{8}$ ", haunts the coast just above high water mark, needs expert examination for identification.

Clubiona sibtilis L. Koch. $\frac{1}{6}$ ", by narrow form and reddish-yellow abdomen. Abundant.

JUMPING SPIDERS.—Eyes in 3 rows, 4-2-2.
Square headed.

- (a) *Hyctia niroyi* Luc. $\frac{1}{6}$ ", by elongated form, black caput, black spot and short legs; first pair very strong. Plentiful.
- (b) *Euphrys arquipes* Cb. $\frac{1}{6}$ ", legs short and annulated. Only one pair has been found.
- (c) *Heliophanus cupreus* Walck. $\frac{1}{5}$ ", black or deep bottle-green with metallic tints, margin of fore abdomen with curved line of white hairs, with about 6 spots on the back. Palpi yellow. One female, Brantingham Dale.

Division 5.—HORNSEA MERE.

Linyphia impigra Cb. $\frac{1}{6}$ ", colouring of male and female somewhat different. Female with two rows of black spots in terminal half of abdomen, and a few conspicuous white ones near the spinners. Rare.

Mengea warburtonii Cb. $\frac{1}{6}$ ", in damp spots, general yellowish-brown in forepart, abdomen dull leaden brown. Also at Skipwith and Sandholme.

Tmetius annis Bl. $\frac{1}{7}$ ", forepart dark red-brown, legs bright yellow-red; near water. The type specimen came from the Mere.

Division 6.—WOLDS.

Styloctetor penicillatus Westr. $\frac{1}{10}$ ", by its small size and situation beneath the bark of trees. Snake Hall (North Cave), Rudstone, Birkhill Wood (Cottingham).

Pachygnatha listeri Sund. $\frac{1}{7}$ ", seize greatly developed and divergent. Cephalothorax bright reddish brown with a distinct black central band, thus from *P. degeerii*, which is also a little smaller. Birkhill Wood, low vegetation.

Clubiona terrestris Westr. $\frac{9}{25}$ ", elongated cylindrical body, yellowish-brown. Bentley Woods (South Cave), on bushes or on the ground.

Anyphaena accentuata Walck. $\frac{4}{7}$ ", forepart with black band on each side; legs light brown, abdomen brownish-yellow marked with black. Lower branches of trees and bushes. Hessle only.

Cebolotes atropos Walck. $\frac{1}{7}$ ", makes a strong sheet web with tube attached beneath the shelter of stones. Birkhill Wood (Cottingham), Speeton Cliffs, Hessle. Also at Bubwith.

Antistea elegans C. L. Koch. $\frac{1}{7}$ ", in wet places, spinners 6 in a transverse row; general colour bright orange or yellow-brown; abdomen darker. Weedley and Brantingham Dale. Also Skipwith and Allerthorpe Common in Derwentland.

Hahnia helveola Sim. $\frac{1}{2}$ ", spinners as last, but altogether of a lighter hue and markings indistinct. One female only, Brantingham Dale.

Division 7.—DERWENTLAND.

Dictyna latens Fabr. $\frac{1}{8}$ ", by dense grey hairs on nearly black ground. Skipwith Common, plentiful on furze by ponds.

Prosthesima apricorum L. Koch. $\frac{1}{4}$ ", jet black colour. Skipwith Common. Rare.

Gnaphosa anglica Cb. $\frac{1}{4}$ ", hind central eyes pearly white and angular, forepart dark brown with a darker V point backwards; abdomen glossy black. Both sexes, Allerthorpe Common.

Theridion impressum L. Koch. $\frac{1}{8}$ ", like a "washed out" *T. sisyphum*. One female, Skipwith Common. Gen. *Theridion* with high, short, swollen abdomen, web irregular. On bushes mainly.

T. vittatum C. L. Koch. $\frac{1}{8}$ ", abdomen reddish, with a distinct narrow dark red-brown band in middle. Allerthorpe Common.

T. bimaculatum Linn. $\frac{1}{10}$ ", abdomen dark reddish-brown, with a distinct pale yellow central band of variable width. Male without the band, but sometimes with two obscure yellow spots on fore abdomen. Skipwith and Riccall Commons, and river bank at Selby, amongst low herbage.

Crustulina guttata Wid. $\frac{1}{12}$ ", forepart with deep punctures; abdomen maroon brown with whitish spots in three lines. Skipwith Common, Houghton Woods (commonly), Sandholme, Bielsbeck, amongst low vegetation.

Cnephilacotes elegans Cb. $\frac{1}{17}$ ", short, squat, blackish appearance; moist places on Skipwith Common by one of the ponds.

Tapinocyba pallens Cb. $\frac{1}{16}$ ", by narrow yellowish-brown appearance. Among vegetable débris, dead leaves, etc. Houghton Woods, Holme-on-Spalding Moor, Riccall Common, mostly in woods.

Hillhouzia misera Cb. $\frac{1}{13}$ ", a brownish spider with a small narrow palpus, in moist places on Skipwith Common.

Drapetisca socialis Sund. $\frac{1}{8}$ ", protectively coloured, roams over tree-trunks and may be easily overlooked; usually plentiful. Houghton Woods. Also on Wolds, South Cave and Brantingham Dale.

Flormia frenata Clerck. $\frac{1}{6}$ ", abdomen pale red-brown, thickly mottled with white cretaceous spots. Skipwith Common and Snake Hall.

Oreonetides firmus Cb. $\frac{1}{12}$ ", yellowish-brown, with a large flat epigyne (somewhat triangular in outline) for its size. Houghton Woods, one female.

Cyclosa conica Pallas. $\frac{1}{4}$ ", abdomen conically prolonged. Skipwith Common; also on Wolds, at Hessle Wood. Shrubberies and woods. Wheel web maker.

- Cercidia prominens* Westr. $\frac{3}{17}$ ", on margin of fore abdomen, in front 7 strong spines from small tubercles in a single row. Skipwith Common, one female from bracken.
- Epeira sturmii* Hahn. $\frac{1}{16}$ ", by general reddish-yellow brown hue and dark shoulders of abdomen; on conifers. Houghton Woods, Skipwith Common and Escrick. Also Div. 8 at Scampston.
- Clubiona diversa* Cb. $\frac{3}{16}$ ", yellowish, abdomen bright orange-yellow. Brantingham Dale and Snake Hall.
- C. trivialis* L. Koch. $\frac{3}{16}$ ", reddish-brown; amongst heather. Skipwith Common, Bielsbeck; also Spurn.
- Zora maculata* Bl. $\frac{1}{4}$ ", yellowish or greyish brown, thorax two broad brown bands, abdomen with distinct markings in three longitudinal lines. Bielsbeck, Skipwith Common, Houghton Woods (commonly). Also Spurn.
- Spiraea gracilipes* Bl. $\frac{1}{16}$ ", reddish-yellow, with black markings on thorax, legs and abdomen. Houghton Woods, one female.
- Hahnia nava* Bl. $\frac{1}{11}$ ", almost uniform blackish. Spinners 6 in a transverse row across the abdomen.
- H. montana* Bl. $\frac{1}{16}$ ", spinners as last; yellower and less hairy, dusky yellowish spots on dark brown abdomen. Riccall Common and Houghton Woods.
- Pisaura mirabilis* Clerck. $\frac{1}{2}$ ", space below the eyes (*clypeus*) high; a pale band on each side of the tapering abdomen. No web. Scarce in Yorkshire. Allerthorpe Common, Houghton Woods, Weedley.
- Pirata piscatoria* Clerck. $\frac{11}{15}$ ", sides of thorax and abdomen thickly with bright silvery hairs. Eyes in 3 rows, 4-2-2. Rare in the north. Allerthorpe Common, several females.
- P. latitans* Bl. $\frac{1}{5}$ ", from congeners by small sizes and sombre colouring, brilliant white spots each side of abdomen. Skipwith Common, Houghton Woods; also the Wolds, Brantingham Dale.
- Lycosa nigriceps* Thor. $\frac{3}{16}$ ", central thoracic band very broad and clear. Riccall, Skipwith and Allerthorpe Commons.
- Erancha talcata* Clerck. $\frac{1}{16}$ ", a jumping spider, deep brown, the female without the conspicuous yellowish white marginal border of the fore abdomen of the male. Ocular area black, surrounded by a broad clear band. Heather and lower branches of bushes, in Houghton Woods.
- Heliophanus flacipes* C. L. Koch. About $\frac{1}{6}$ ", from *H. cupreus* (p. 451) by unicolorous legs, blackish brown palpi and absence of white markings on abdomen. Allerthorpe Common, one male; also Dunes, Spurn, both sexes.

II. HARVESTMEN.

Eight legged creatures, whose head, thorax and segmented abdomen are all in one piece. Eyes two,

one on each side of an eye eminence. Without poison and unable to spin for any purpose whatever. Males are the smaller, better coloured and armed. Harvestmen mostly hunt their prey by night, and are fond of moisture, sipping the drops of dew ; they are usually abundant where found, and with few exceptions occupy a great variety of habitats, the fifteen East Riding species selecting from roots of grass or herbage, tree trunks, bushes, fallen leaves, moss and débris, or the shelter of stones, logs, etc., in meadows, pastures, lanes and woods. There is an interesting diversity of structure in connection with their habits. Some openly expose themselves, and have long legs wherewith to escape their enemies or pursue their prey, and are mostly "annuals." Others are more sluggish, and conceal themselves, and as non-prey-pursuers have short legs, and in some instances apparently live longer than a year.*

Fam. PHALANGIIDAE—palpi with a claw.

A.—Eye eminence without teeth.

LIOBUNUM by rounded body and extremely long and slender legs.

L. rotundum Latr. $\frac{1}{8}$ ", eyes black rimmed ; two blunt processes in front below edge of body. Div. all except 1 and 4.

L. blackwallii Meade. Somewhat smaller, eyes white rimmed ; blunt processes absent. Not common. Div. 3, River Hull Bank and Humber Bank East.

I.

B.—Eye eminence with teeth.

PHALANGIUM oblong oval abdomen with fine denticulations. An irregular group of teeth on caput. (See OLIGOTROPHUS *infra*.)

P. opilio Linn. $\frac{1}{4}$ "- $\frac{1}{2}$ ", two small conspicuous teeth in front

* Other information in "Notes on Harvest Spiders," *The Naturalist*, July, 1906, and "The Harvestmen of Yorkshire," *The Naturalist*, March, April and May, 1916.

below the edge of the body. Male seizers develop a large horn. Div. all except 5. Abundant.

P. panetinum Deg. $\frac{3}{5}$ " - $\frac{4}{5}$ ", these teeth absent. On walls and in houses, less common. Div. 3, Humber Bank East and New Joint Dock. Div. 6, Welton.

P. saxatile C. Koch. Much smaller : general colour light grey with a central line of conspicuous white spots. Most common in chalky areas. Div. 2, 3, 6, 7.

OLIGOTROPHUS most easily from PHALANGIUM by the three spines in a line on the frontal edge. In doubtful examples, OLIGOTROPHUS has a very strong tooth beneath the seizers at the base, difficult to make out unless organs are removed ; in PHALANGIUM this is wanting.

(1) Frontal spines small.

(a) These spines equal and wide apart.

O. morio Fabr. $\frac{3}{4}$ " - $\frac{4}{5}$ ", abundant. Div. 1 to 8.

(b) Spines closer together and middle one slightly longest.

O. agrestis Meade. $\frac{3}{5}$ " - $\frac{4}{5}$ " spines slightly inclined and middle one a little in advance ; genital plate with a circular excision. Abundant. Div. 2 to 8.

O. tridens C. L. Koch and *O. hansenii* Kraepl. Spines in a straight line and nearly vertical ; genital plate not excised.

O. tridens C. L. Koch. Lighter coloured ; femora of legs angular. Frontal spines slender and a little separated. $\frac{4}{5}$ ". Div. 2, 3, 6, 7.

O. hansenii Kraepl. Smaller, darker coloured, frontal spines stouter and contiguous. Div. 3, Hedon. Very rare.

(2) Frontal spines strong and nearly vertical.

(a) These spines unequal, in a straight line.

O. palpalinalis Herbst. $\frac{4}{5}$ ", front outside edge of humeral joint of palpi with a row of 5 strong denticulae (see PLATYBUNUS). Div. 2, 6, 7. Less common.

(b) Frontal spines equal and a little inclined forward.

O. cephaliatus C. L. Koch. $\frac{4}{5}$ ", humeral joint with small blunt teeth topped by minute black spines. Div. 1 to 8.

II.

Palpi with more or less strong projections.
Eye eminence large.

PLATYBUNUS eye eminence, teeth small and blunt.

P. corniger Herm. $\frac{6}{5}$ ", two joints with projections. Male seizers develop a large horn. Div. 1 to 8.

MEGABUNUS eye eminence with two rows of 5 or long divergent teeth.

M. corniger Meade. Div. 1, Houghton Woods.

Fam. NEMASTOMATIDÆ—palpi without a claw.

- Nemastoma lugubre* Müll. $\frac{1}{2}$ "- $\frac{1}{3}$ ", black with two large conspicuous yellowish-white patches; legs short. Div. 1 to 8.
N. chrysomelas Herm. Legs long and very slender; abdomen with pairs of dull golden metallic spots. Much less common. Div. 6, Hessle and South Cave. Div. 7, river bank at Selby.

III.—FALSESCORPIONS.

Characterised by their small size and their long pedipalps ending in crab-like pincers (the hand and two fingers). They keep in strict seclusion, and are thus very rarely seen unless by accident. They can spin, but only retreats to serve as shelters during the winter or when changing their skin or looking after their young. The spinning mechanism is in one of the mouth parts, the organ beneath the chest, once considered to be this apparatus, being really cement glands for the construction of a brood case* which remains *in situ*.

A.—EYES FOUR.

Obisium muscorum Leach. About $\frac{1}{8}$ ", fingers curved. Among moss, dead leaves, etc. Div. all except 1 and 4, common.

CHTHONIUS—fingers straight.

C. rayi L. Koch. About $\frac{1}{12}$ ", cephalothorax wider in front than behind. As last; also under stones, logs, débris. Div. 2, 3, 4, 6.

C. tetrachelatus Preyss. $\frac{1}{16}$ ", cephalothorax equally wide; near the fixed finger a depression. Scarcer. Div. 3, Marfleet and Saltend. Div. 4, Spurn.

B.—EYES TWO.

Chelifer latreillii Leach. $\frac{1}{11}$ ", always near the sea; Spurn in plenty beneath pieces of wood and in sheathing bases of marram grass.

Chiridium museorum Leach. $\frac{1}{19}$ ", by minute size and shape regularly oval, wide behind and pointed in front. In old houses, beneath bark of trees, among old books, nests, etc.

* For other information see "Falsescorpions of Yorkshire," *The Naturalist*, May and June, 1916.

Div. 2, one example, Thorpe Garth, near Aldborough, in a glass of water. Usually stated to have no eyes, but this is an error.

C. EYES NONE.

Chernes nodosus Schr. $\frac{1}{2}$ ", in vegetable débris and manure heaps. Males are occasionally seen clinging to the legs of flies or harvestmen in autumn. Div. 1, one example, Hull.

C. dubius Camb. $\frac{1}{2}$ ", in débris on the ground or under stones in unbroken country. Div. 6, Birkhill Wood, Cottingham. It is very probable that if the chaff and refuse in barns were searched, examples of *C. panzeri* C. L. Koch would turn up.

IV.—MITES.

In general very minute in size, with larger species amongst the "ground mites." Very variable in structure and habits; some with remarkable life histories. Of immense economic importance. Innumerable hosts of them now thought to be engaged in sanitary work for the benefit of man or other animals, ever cleaning things up, and devouring the germs of fungi, harmful bacteria, etc., which, if left to develop would prove dangerous. Sycamores, limes, etc., even make snug little retreats for them in the axils of their leaf veins, covering the entrance with tufts of hair. When on other animals not always parasitic (living at the expense and to the detriment of their hosts), but in mutual companionship, e.g., *Gamasus colcoptatorum* (nymphs) and *Macrocheles glabra*, a much smaller species, adults (females only), beneath *Geotrupes*; and the species which inhabits the air-chamber of slugs, all acting as scavengers to cleanse their hosts in return for dissemination or shelter.

Others are obnoxious or destructive: the actual or suspected carriers of disease, e.g., ticks and the "louping ill" of sheep; *Tarsonemus hominis*, a new

mite, found twice associated with tumours ; *T. woodii*, the cause of the deadly Isle of Wight disease amongst hive bees. A few seem incentives to cleanliness, Demodex and Scabies, which may be the precursors of other skin complaints. The mites of the East Riding have been practically unworked, and the records below by no means represent their true numbers or distribution. The gall mites are omitted (see Plant Galls).

I.—ORIBATIDAE ("beetle" mites) in a chitinous covering, rounded, dark brown or black "specks" easily overlooked, or of more elongated form.

Euzetes globulus Nic. By larger size and globular black appearance. Brantingham Dale, Houghton Woods, Hornsea.

Ceratoppia bipilis Herm. Very much smaller, not so black, by structure of large lamellae on thorax. Abundant and widespread. Houghton Woods.

DAMAEUS, legs very long and spinous, abdomen globose.

D. claripes Herm. Legs femur IV.=twice coxa IV.; projection between 1st and 2nd pair of legs acute. Cottingham, Houghton Woods, King's Mill Marsh (Driffield).

D. geniculatus Linn. Femur IV.= $\frac{1}{2}$ coxae IV.; projection obtuse. Brantingham Dale, Weedley, Houghton Woods, Skidby Chalk Pits.

In all the above and others, the anal and genital apertures are small, subequal and well separated. In another group they are longer, unequal and close together, but none of them have been recorded in the East Riding.

II.—GAMASIDAE—brown earth mites.

1st division sluggish, legs short. Genital orifice of male in middle of sternal shield, usually circular. None recorded.

2nd division active, legs long, especially 1. and IV.; male orifice on or before margin of sternal plate and usually transverse.

GAMASINAE, leg II. of male swollen, one or more joints spurred.

(1) Parasite of animals.

Haemogamasus hirsutus Berl. Sternal shield hairy; in moles' nests. One example. Sunk Island.

(2) Not parasitic.

- (i.) Tarsi legs I. without an ambulacrum (walking joint).

Macrochelus superbus Hull. One dorsal shield ; femur IV. and patella IV. spurred. Welwick shore.

- (ii.) All tarsi with an ambulacrum.

- (a) Anal aperture in ventral shield. Dorsal shields two.

* Tarsi I. not spined.

Gamasus coleoptratorum Linn. Beetles and in manure heaps. Usually abundant.

G. anglicus Hull. Brantingham Dale, one male.

** Tarsi I. at least one spined.

G. cornutus Can. Piriform, hairs rod-like. Usually abundant. Westwood, Beverley.

(b) Anal plate separate.

- * Dorsal shields ; division between them a mere line or obsolete.

Oligamasus calcaratus Koch. Dorsal and ventral shields continuous. Brantingham Dale.

Pergamasus crassipes Linn. Dorsal and ventral shields not continuous. Abundant and widespread.

** Dorsal shield divided at least partly. Anal shield broad and three-sided.

Cyrtolaelaps nemorensis Koch. Dorsal shields two, space between them rounded in the middle. Hornsea Mere, Houghton Woods, Brantingham Dale.

III.—"SNOUT" MITES.

Bellula littoralis Linn. By apical setae of palpus being the same length. Humber shore near Hull.

IV. HYDRACHNIDAE Water Mites.

- (1) Eyes close together near median line. Eye plates joined by a bridge. Red.

Eylais infundibulifera Koen. Fore margin of eye bridge well rounded. Barnsbee Drain, near Hull.

E. discreta Keen. Fore margin of eye bridge weakly toothed. Barnsbee Drain.

Neither species has a third disc in median line of bridge.

- (2) Eye plate none. Eyes widely separated and on sides.

LIMNESIA tarsi IV. a bristle instead of a claw.

V.C. or no definite locality.

L. koenigi Pier. Projection near base of female palp not "shouldered."

L. fulgida Koch. Projection with a shoulder.

L. maculata Müll. As last, but epimeral plates of legs curve inwards. Barnsbee Drain and Houghton Woods.

V.—**THROMBIDIIDAE** include the red velvet mites.

Anystis baccarum Linn. The ubiquitous "red spider," restless, triangular shaped.

The **THROMBIDIINAE** and **RHYNCHOLOPHINAE** have continuous pubescence on body and legs and a chitinous crista close to their front margin.

A.—**THROMBIDIINAE.**

Mandibles external and hooked. Eyes always 4.

(1) Sensory hairs behind the middle of the crista.

Microthrombium similans Berl. Body hairs spiniform, and shortly fusiform; eyes sessile. King's Mill Marsh, Driffield. Known elsewhere from Ireland only.

Enemothrombium bullatum Geo. Body hairs crassate, everywhere contiguous in living animal. Eyes on a tuber. Hornsea Mere (near water).

(2) Sensory hairs before the middle of the crista.

SERICOTHROMBIUM—indented on posterior margin.

Eyes on long peduncles.

S. holosericeum Linn. Dorsal hairs in thoracic region different from the rest. Common.

S. scharlatinum Berl. Dorsal hairs uniform, very slightly clavate with rounded tips. Hornsea Mere.

S. brevimanum Berl. Dorsal hairs much shorter, all truncate clavate with expanded tips. Unlike the other two also tarsi 1. much thicker than tibia 1. Weedley.

B.—**RHYNCHOLOPHINAE.**

Mandibles internal, not hooked. Eyes 2 or 4, sessile.

Smaris expalpis Herm. Part only of crista present, so that the mite seems to have also a pair of median eyes (*i.e.* six altogether). Weedley Springs and Brantingham Dale.

(1) Eyes four; caput spherical, bristly.

Rhyncolophus phalangioides Degeer. Palp fourth and third joints, with five and four teeth respectively. South Cave.

R. regalis Koch. Palp with a few external teeth. Auburn (Bridlington), Mt. Airey, Meaux, Welwick.

(2) Eyes two.

Smaridia ampulligera Berl. Strongly shouldered, with crassate or scaly hairs. Brantingham Dale. Elsewhere noted for Scotland.

Ritteria nemorum Koch. Transverse furrow behind the thorax. No spherical caput. Widest at the shoulders. The adult form of the red harvestman parasite. Common.

Achorolophus norvegicus Thor. Transverse furrow absent. Crista in a wide chitinous channel. Hornsea Mere.

PLANT GALLS OF EAST YORKSHIRE

By W. FALCONER, F.E.S.

NOTHING in nature surpasses in intrinsic interest those joint productions of the animal and vegetable worlds known as plant galls. These peculiar growths are formed on most kinds of plants, not excepting seaweeds, algae, mosses and fungi, through the action of various insects, mites, eelworms and parasitic fungi. Much greater attention has been given to them abroad, so that it has not yet been generally recognised in this country that their attractiveness as a pursuit for the field naturalist, as well as for the more serious research of the inquirer into nature's secrets, consists not only in their immense variety of form and structure, arising apparently from the same cause in some the irritation of a larva, in others that of a developing egg (nevertheless altogether characteristic and "true" for each species) — but also in the fascinating problems connected with the mystery of their inception and development. There is no such thing, as was once thought, as the injection of a poisonous fluid to excite morbid growth; a liquid is certainly used by many insects, but rather as a lubricant for their ovipositors, or as a seal for the injury inflicted by their use. Many, too, have been found to contain fungoid growths, suggesting that they are really due to these and not to the supposed agents, the latter being merely the

carriers of the spores, their larvae, on hatching out, taking advantage of the shelter provided by the abnormal growth, and finding within it an easily obtainable and concentrated highly nutritious pabulum.

From their situation, plant galls have come to be regarded as the concern of the botanist alone, but leaving out of account what has already been said, they are just as much that of the entomologist. The lepidoptera, coleoptera, diptera, hymenoptera, homoptera, acari, etc., especially the last four named, all supply ample material for the expert's consideration, each in his own particular domain. Whatever may be the case with some of these orders, very little, if anything, is known in this country about gall "flies." They cannot, however, have escaped notice, as there are so many of them, but, what is more probable, have been ignored, because they could not be identified. The pursuit, therefore, should not be limited to ascertaining the occurrence, number and distribution of the various galls in any district, but attempts made to breed out the various agents, for if this is not done, too much is often taken for granted. For this purpose the insect must be sufficiently advanced in its development, or if not, given as natural conditions as possible. A little knowledge sometimes is not amiss ; for instance, the distinctive "oyster" gall of the oak falls to the ground to complete its development, but is not in the desired condition until it becomes discoloured and dark brown. The emergents, however, often complicate matters very considerably, consisting as they do, not only of the true agents, but also of inquilines and parasites, in many cases all closely related to each other. Thus it will be seen that there are difficulties in the way of breeding them out and identifying them,

but with increasing experience and perseverance, they will not be found insuperable, and as the flies themselves are neglected, the study of plant galls affords one of the best means for filling up blanks in the "fly" fauna of any area—blanks which can be filled, as things are, in no other way. Some of the discoveries already made have been quite unexpected.

One cannot work long in the field without realising that plant galls and their inmates are very effectively protected in some way from the effects of the weather and outside enemies, although occasionally examples of *Cynips kollari* on the oak, and *Rhodites rosae* on wild roses may be seen pecked about more or less by tits. If the enquiry be followed to a conclusion, it will be seen that the adaptations for the purpose of protection amongst galls very closely resemble those acquired by fruits. They were, however, produced from quite a different cause, and developed to serve a totally different end; in the one to secure the safety and distribution of the seed, and in the other those of the larvæ.

The Plant Gall Committee of the Yorkshire Naturalists' Union, during its brief existence of less than two years, has done good service, but individual research, mostly in N.E. and S.W. Yorkshire, carried on for a longer period, has been much more productive of results. The few records from the area within the purview of the British Association are from Selby,* Skipwith Common,* Askham Bog* and Bubwith.* There are none for the vicinity of Hull, but probably there, as elsewhere, large numbers are merely awaiting discovery. In these circumstances, all that can be

* *Ibid. The Naturalist*, April, 1922, pp. 129-130.

² *Ibid.*, January, 1920, p. 15; and February, p. 71.

done is to indicate some of the more obvious forms, which should be in evidence at the time of the meeting in September, grouping the agents in their natural orders to facilitate reference to any particular group.

It would be of interest and value if some competent observer noted deformations of the leaves, stems, or inflorescence of the ground vegetation, sufficiently accentuated, caused by *Aphrophora spumaria* L., or by *Thrips* spp., which are accepted as valid gall agents on the Continent; and if *Vaucheria* spp., growing in wet spots, were searched for the curious elongated gall of *Notommata wernecki* Ehren.

COLEOPTERA.

Many of the gall-producing beetles have not been noticed anywhere in Yorkshire. Several of those, which have, are said in the Victoria County History to be common and widely distributed (these are asterisked below); in addition a few rarer ones have been noted locally in the East Riding, but except in two instances there is no specific mention that the galls themselves were seen. Some complete their metamorphoses in the gall and others not.

I.—AFFECTING THE INFLORESCENCE.

- **Apion apicans* Herbst. Flowers into a hard tuberculated mass. Stamford Bridge.
- A. assimile* Kirby. Calyx swollen and floral axis thickened. Both on *Trifolium pratense*.

II.—SEEDPOD SWOLLEN.

- **Ceuthorrhynchus assimilis* Payk. On *Sinapis arvensis*, *Sisymbrium officinale* and *Brassica rapa*.

III.—STEM SWELLINGS (or on Root, or on both).

- **A. violaceum* Kirby. On docks.
- Saperda populnea* Linn. Smaller branches of poplars and willows. Askham Bog. Galls observed.
- **C. contractus* Marsh. Base of stem. Gen. *Brassica*.

**C. peltatum-stigma* Marsh. Base of stem. *Brassica*, *Sisymbrium*, *Cheiranthus*, etc.

Pullulus rufi Koch. Very small, feeble, unilateral, usually basal swelling. On *Cardamine amara*, which is rare in East Riding, occurring at Kirkham and Howden. The beetle has been taken at Doncaster and Scarborough.

IV.—SWELLINGS ON MIDRIBS AND PETIOLES OF LEAVES.

**Apion humile* Germ. On dock sorrels.

A. gyllenhali Kirby. Also on stems and floral peduncles of *Vicia sepium*. Skipwith Common.

A. miniatum Germ. On docks. Bubwith.

A. quadridens Panz. On radical leaves of radish. Hull.

LEPIDOPTERA.

Generally speaking, the gall moths—found amongst the Tortrices and Tineae—are local in distribution, and most of them do not occur in the East Riding. In those which have been recorded, there is no definite mention of the galls, which have probably escaped notice altogether. The time of year is not suitable, and deserted growths will in most cases only be met with, if any.

I.—STEM SWELLINGS.

Pterophorus microdactylus Hub. Hemp Agrimony.

Pammene splendidulana Steph. Young branches of oak. These two have been taken at Scarborough and may occur in the East Riding.

Epiblema tetraquetra Haw. Twigs of alder and birch. Skipwith, Askham Bog.

Stenolochia gemella Linn. End of branch incurved and swollen. Oak. Skipwith.

Phaloma atrifasciata Steph. *Senecio jacobaea*. Flamborough, Scarborough.

Grapholita sericeana Dup. Branches of willow spp. Askham Bog, 1884.

HYMENOPTERA.

The agents belonging to this group are numerous and include in their number the most interesting and wonderful of all gall-causers, the Cynipidae of the oak,

which display the wonderful phenomenon of parthenogenesis. In most of them there are two generations with different specific names, the first sexual with both males and females; the second agamous, consisting of females only. In a few there is the sexual generation only and in rather more the agamous only. Many of these galls, the "spangles" and "peas," will doubtless occur plentifully. The hymenopterous larva is without the breast "anchor process" of the dipterous one (see p. 471).

I.—GROWTH ARRESTED (a "cigar-shaped" terminal gall).

Isosoma graminicola Gir. On couch grasses.

II.—BUDS.

(a) Of the oak.

Biorrhiza pallida Oliv. The "oak apple."

Andricus collaris Htg. Very deeply imbedded in bud.

A. fecundator Cam. The oak "artichoke" gall.

A. solitarius Fonsc. The red hairy spindle gall. Sexual only.

Cynips kollari Htg. Agamous only, the oak "marble" gall.

(b) Of the wild rose.

Rhodites rosae Linn. "Bedeguar."

(c) Swollen—on willows.

Cryptocampus ater Jur. On *S. caprea*, *cinerea*, *fragilis*.
Askham Bog.

C. saliceti Fall. On *S. aurita*, *cinerea*, *viminalis*, near Skipwith Common.

III.—CAPSULE.

Aulax papaveris Perr. Swollen and partitions destroyed. On poppies.

IV.—STEM SWELLINGS—see section Diptera.

Isosoma depresso Walker. On *Festuca ovina*.

Aulacidea hieracii Bouche. On couch grass, common toadflax and hawkweeds.

Cryptocampus medullarius Htg. On *Salix pentandra*. Askham Bog.

Diastrophus rubi Htg. On bramble.

Andricus trilineatus Htg. Small swellings on twigs of oak.

Xestophanes potentillae Retz. Fused swellings on *P. reptans*.

River bank above Selby.

X. brevitarvis Thoms. On *P. tormentilla*—never fused.

V.—IN BARK OF THE TRUNK, oftenest near the ground.
Andricus corticis Htg. Usually many together, on the oak.

VI.—ON THE ROOT.

- A. radicis* Fabr. A large plurilocular swelling on the oak, sometimes close to soil above ground.
Biorrhiza aptera Bosc. Deeply in the ground, usually aggregated, but not fused. Oak and beech.

VII.—ON THE LEAVES.

(1) "Pea" galls.

Pontania salicis Christ. Glabrous. Willows, Skipwith Common.

P. pedunculi Htg. Hairy. Willows. Askham Bog.

Dryophanta diversa Htg. Becomes hard, and will not "give" if pressed between fingers.

D. agama Htg. Similar, but with thin walls. Agamous only.

D. disticha Htg. Two-celled. Agamous only.

Andricus ostreus Gir. With two membranous valves at base and beautifully spotted red. Agamous only.

Dryophanta longiventris Htg. Striped pea gall. The above five on the oak.

Rhodites eglanteriae Htg. On wild rose.

(2) "Cherry" gall.

Dryophanta folii Linn. On oak.

(3) Bean galls.

Pontania proxima Lep. The commonest form on all kinds of willows. Everywhere.

(4) Petiole swollen.

Cryptocampus venustus Zadd. *Salix aurita, caprea, purpurea,*

C. testaceipes Zadd. or on midrib *S. alba, fragilis, purpurea, triandra.*

Andricus testaceipes Htg. or midrib. On oak.

(5) Margin curved and deformed.

A. curvator Htg. Curved leaf gall of oak. An internal gall.

(6) Leaf rolled up into a pouch.

Blennocampa pusilla Klug. On *Rosa canina*. Larva greenish, with dark head. Two dipterous larvæ live in similar galls.

(7) "Spangle" galls of the oak.

Trigonaspis renum Gir. Kidney-shaped along the veins.

Nesoteras lacustris Schr. "Smooth" spangle.

N. lenticularis Oliv. Common spangle, glabrous below.

N. tumidensis Htg. "Capped" spangle, both surfaces sparsely hairy.

N. numismatis Oliv. "Silk button" gall.

The sexual form of the last, *N. sinuata* Schl., the "leaf blister," without an internal gall, persists until October.

DIPTERA.

The diptera are by far the most prolific of all in gall agents. In some cases the larvæ complete their transformations in the gall, and in others in the ground, leaving behind the perforated growth. A large number of the forms are tinted some shade of red or yellow, etc., or zoned merely, and are in consequence conspicuous to the eye, but this is not a characteristic, as some mites and homoptera have also coloured galls. Mites, too, often produce pimple like growths on the leaves similar to those of the diptera. The dipterous one is closed, each larva usually in its own cell, and at the proper time, the perfect insect makes its way out through the side or apex of it. The mite gall has an opening (guarded by abnormal hairs) on the surface opposite to the projection, and the mites live gregariously in its interior.

The larvæ in this order may be readily distinguished from others by the "anchor process" variously shaped, situated close to the head on the under surface of the body, and in all cases should be examined to determine whether structure is due to the diptera or hymenoptera, which make similar galls.

I.—FLOWER BUDS closed and swollen.

Asphondylia sarothonni H. Löw. On broom.

Contarinia steinei Karsch. On white and red campions.

II.—INFLORESCENCE.

(1) Flowers deformed and swollen.

Ametropidopsis thalictricola Rübs. Meadow rue, Bubwith.

Contarinia craccae Kieff. On *Vicia sepium* and *cracca*.

C. loti Degaer. On *Lotus uliginosus*.

(2) Floral receptacle swollen.

Urophora macrura H. Löw. On groundsel.

U. solstitialis Linn. On knapweed. Not visible externally, but hard between fingers. River bink above Selby.

III.—INFLORESCENCE—STEMS OR LEAVES.

- Perrisia gili* H. Löw. Nearly spherical, on bedstraw.
Contarinia tiliarum Kieff. Globular, on limes.
Rhopalomyia millefolii H. Löw. Ovoid or cylindrical, on yarrow and sneezewort, river bank above Selby.
R. tanacetica Karsch. On tansy. Similar to the last. Skipwith Common.

IV.—CAPITULUM SWOLLEN.

- Misopathea ptarmicæ* Vallot. A hairy sub-globular spongy mass, on sneezewort and yarrow.
Phorbia seneciella Meade. On *S. jacobaea*, slight.
Carpotricha papillata Fall. On *Hieracium umbellatum*.

V.—FRUIT.

(1) Swollen.

- Semudobia betulae* Winn. Birch.
Perrisia fructuum Rübs. *Cerastium triviale*.
P. papaveris Winn. Divisions not destroyed. Poppies.
 (2) Pods of broom deformed and with swelling at basal end.
 (a) *Asphondylia mayeri* Lieb. Orange larva.
 (b) *Trotteria sarothonini* Kieff. Larvæ gregarious, orange red.
 (c) *Cecidomyia* (?) sp. Larvæ milk-white, clavate, very active.

VI.—BUDS.

- (1) Axillary of broom deformed and swollen.
 (a) *Asphondylia sarothonini* H. Löw.
 (b) *Perrisia tubicola* Kieff. Enlarged, tube-like.
 (2) Axillary of gorse.
A. ulicis Verrall. Swollen, oval or conical, fleshy.

VII.—STEMS—see section Hymenoptera.

- (1) Many grasses have swellings on the stems, at the base or higher up the stem according to species, sometimes concealed beneath the leaf sheath.
 (a) Unilateral swellings—(i) slight.
Mayetiola moliniae Rübs. On *Molinia*.
M. dactylidis Kieff. On *Dactylis*. And others.
 (ii) strong.
M. ventricosa Rübs. On *Molinia*. Skipwith Common and Askham Bog, in plenty. And others.
 (2) Willows also have stem swellings, some unilateral, others taking in the whole periphery, some feeble, others strong, the commonest being
Rhabdophaga salicis Schrk. Askham Bog.

(3) INTERNODES SHORTENED into a terminal
“cigar” gall.

Chlorops taeniopus Mgn. Barley fields and couch grasses.
(Note *Isosoma graminicola* Gir. on p. 469.)

Lipara lucens Mgn. *Phragmites communis*, Askham Bog, in plenty.

(4) Several occur at the base of sedges, and four of them have been found in Askham Bog, viz., swellings caused by—

Dichrona gallarum Rübs.

Hormomyia kneuckeri Kieff.

Dishormomyia cornifex Kieff.

Pseudohormomyia granifex Kieff.

VIII.—LEAVES.

(1) Pustules in parenchyma.

Oligotrophus ulmi Kieff. Elm.

Contarinia betulina Kieff. Birch.

Perrisia fraxinea Kieff. Ash, river bank above Selby.

(2) Pimples—(a) showing on both sides of leaf.

Iteomyia capreae Winn. Single-celled, with round opening on lower projection. *Salix* spp., Skipwith Common, Askham Bog.

I. capreae Winn. var. *major* Kieff. On the midrib, extending to the lateral veins, an irregular, woody, many-chambered swelling. *S. aurita*, *caprea*, *cinerea*. As the last.

Perrisia ulmariae Bremi. Meadow sweet. Everywhere.

(b) Showing above only.

Oligotrophus bursarius Bremi. Ground ivy. Askham Bog.

Harmandia tremulae Winn. Aspen.

Hartigiola annulipes Htg. Soft, hairy, blunt pointed. Beech, Bubwith.

Mikiola fagi Htg. Woody, glabrous, sharp pointed. Beech.

(3) Swelling at leaf base, stem or flower stalk.

Perrisia urticae Perr. Nettles. Common. Askham Bog.

(4) Depression below, with corresponding elevation above.

Mikomyia coryli Kieff. Hazel.

Perrisia engstfeldi Rübs. Oval contour, red zoned.

P. pustulans Rübs. Circular contour, zoned yellow. Askham Bog. Both on meadow sweet.

(5) Bunches of leaves—(a) Terminal.

Rhabdophaga rosaria H. Löw. *Salix* spp.

Perrisia crataegi Winn. Hawthorn.

Taxomyia taxi Inch. Yew.

(b) Axils of leaves.

Perrisia rosariella Kieff. Small. *S. aurita* and *cinerea*.

(c) Last two verticles within each other, and deformed.

P. hygrophila Mik. *Galium palustre*, Askham Bog.

(6) Terminal leaves—(a) rolled within each other.

Rhabdophaga terminalis H. Löw. *Salix* spp. Common.

Perrisia serotina Winn. Swollen, keeled at base.

P. hyperici Bremi. Neither keeled nor incurved. Both on St. John's Wort.

(b) erect and applied by edges.

P. cernuicæ Vallot. Covered with white pubescence. Speedwell.

(7) Midrib or lateral veins swollen.

Rhabdophaga nervorum Kieff. *Salix* spp.

Massalongia rubra Kieff. Birch.

Perrisia nervicola Kieff. *Hieracium pilosella*.

Perrisia plicatrix H. Low. Leaf distorted and bent also. Brambles. Common. Selby, York, Skipwith Common.

(8) Leaf and stipules into an ovoid gall.

P. loticola Rübs. Larvæ gregarious, orange. Skipwith Common, Askham Bog.

Contarinia barbichei Kieff. Somewhat similar in appearance, larvæ white or sulphur yellow. Both on birdsfoot trefoils.

(9) Lobes of leaf.

Macrodiplosis dryobia F. Löw. Turned down on to lower surface. Askham Bog. A smaller turn down is made by an aphid, *Callipterus quercus*, in the same place.

M. volvens Kieff. Turned over on to upper surface. All on the oak.

(10) Leaf rolled up or down to form a pouch or pod—

(a) on ash.

Perrisia acrophila Winn. Larvæ gregarious, white.

P. fraxini Kieff. Larvæ gregarious, yellow.

(b) wild roses.

P. rosarum Hardy. Larvæ yellowish red.

Dirhiza rhodophila Hardy. Larvæ white.

(c) clovers.

P. trifolii F. Löw. Rolled upwards.

P. viciae Kieff. Leaflets of terminal leaves generally many together. Askham Bog.

(11) Margins rolled up or down.

P. marginum torquens Winn. Closely downwards in long rolls. *Salix* spp. Everywhere.

P. nicholliana Mik. Closely downwards in short rolls. *Salix alliata*.

P. tortrix F. Low. Closely upwards. *Prunus*, near York.

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P. persicariae Linn. Loosely rolled downwards. *P. amphibium.*
Askham Bog.

P. populeti Rübs. Loosely rolled upwards. Aspen, Askham
Bog.

P. filicina Kieff. Pinnule margins downwards. Bracken.
(12) Leaves folded longitudinally.

Macrolabis corrugans F. Low. Larva white, within the folds.
On hogweed, near Askham Bog.

(13) Leaflet folded with torsion of midrib.

Contarinia sorbi Kieff. On mountain ash.

(14) Leaf base thickened and margins rolled back.

P. ranunculi Bremi. On buttercups.

HOMOPTERA.

Greenflies are ubiquitous and destructive, and a large number of them cause galls, some of which are large and of curious structure as on the elms, poplars and firs, and others, as the "American Blight," of economical importance. Most are tinted or discoloured.

I.—ROOTS, STEMS AND BRANCHES.

Myzoxylus laniger Hausm. The "American Blight," irregular protuberances, first soft, then woody, on cultivated apple and crab trees.

II.—STEM.

Hyalopterus melanocephala Bktn. Summit bunched and distorted. Aphids often crowd into the capsules. On bladder campion.

III.—TERMINAL TWIGS.

Asterodiaspis quercicola Bouché. Pits accompanied by discoloration in the bark of young oaks. This Coccid gall has occurred at Huddersfield and Leeds.

IV.—BUDS.

Chermes abietis Kalt. "Pineapple-like" galls on pine, fir, spruce and larch. And others.

V.—LEAVES.

(1) Blistered and wrinkled.

Myzus ribis Linn. and *Rhopalosiphum ribis* Linn. On currants and gooseberry.

Aphis brassicae Linn. Gen. *Brassica*, etc.

(2) Folded downwards.

Pemphigus annis Kalt. From the midrib. Black poplar,
river bank near Selby.

Phyllaphis fagi Linn. Bent along a lateral vein. Beech.

(3) Terminal leaves tufted—(a) not deformed.

Brachycolus stellariae Hardy. *Holeus mollis*. *Agrostis alba*,
Agropyron repens.

(b) deformed.

Aphis viburni Scop. On Guelder rose. Askham Bog.

A. sorbi Kalt. On *Pyrus* spp.

Psylla buxi Linn. Forming a hemispherical gall on box.

(4) Terminal leaves into tassel-like mass.

Livia juncorum Latr. On *Juncus* spp. Askham Bog.

(5) Mostly marginal deformation, rolling, etc.

(a) Loosely downwards and upwards.

A. atriplicis Linn. Into two hollow pods. Goosefoot and
orache, river bank above Selby.

Psyllopsis fraxini Linn. On ash. As the last.

Schizoneura ulmi Linn. On elms. York district, common.

A. rumicis Linn. On docks.

A. hederae Kalt. On ivy.

(b) Crumpled, swollen or distorted.

More than one species on Gen. *Pyrus*, some galls green,
others coloured. The aphids will probably have vacated
their shelter. Similarly there are different species on
Gen. *Prunus*.

(c) Rolled upwards.

Brachycolus stellaria Hardy. On *Stellaria Holostea* and
graminea.

(d) Small portion at edge turned downwards.

Callipterus quercus Kalt. On oak. Askham Bog.

(e) On Petiole.

Pemphigus spirothecae Pass. Spirally rolled appearance.
Black poplar.

P. bursarius Linn. A somewhat conical projection, with
rounded opening at top. Black poplar.

(f) Midrib rolled into a pouch.

P. flaginans Fonse. With a long vent on under surface of leaf.
Black poplar.

ACARI.

The mites which cause the production of galls are
degenerate in structure, elongate in form, of micro-

scopic size, with two pairs of legs only, and as agents rank next to the diptera in number. Their galls either without or within or both, are characterised by hairs differing altogether in type from the ordinary pubescence. Such as are merely patches of hairs, often scanty or in rows merely, may very easily be overlooked except by the careful searcher. Only the more conspicuous of these are noticed. The pimple-like growths have a hair-guarded opening on the opposite surface of the leaf.

I.—“BIG” BUDS.

Eriophyes psilaspis Nal. Yew.

E. rufis Can. Birch.

E. avellanae Nal. Hazel.

E. ribis Nal. Currants and gooseberry.

E. calycobius Nal. Rare on hawthorn.

II.—INFLORESCENCE.

E. tenuis Nal. Spikelets and floral parts elongated. Grass spp.
Askham Bog.

Tarsonemus spirifex March. Spikelet deformed or inflorescence rolled into loop or gimlet shape, or base of stem. *Agrostis*, *Calamagrostis*, *Avena*.

III.—FLOWERS AND FRUITS swollen and deformed.

E. fraxini Karp. Ash.

IV.—TERMINAL LEAVES.

E. thomasi Nal. Into a globular mass covered with cottony wool-like hairs.

E. vitalbae Can. Deformed, curled and crumpled. On *Clematis vitalba* (rare in E. Riding).

E. destructor Nal. Upper part elongated and deformed. On stonecrop.

V.—LEAVES.

(a) Depression below leaf, with corresponding elevation above.

E. rufis Can. var. *lionotus* Nal. In axil, depression filled with cylindrical contorted hairs. Birch.

E. rufis var. *longiseta* Nal. Elevation with rough yellow, brown or red felt; depression with white club-shaped hairs.

(b) Pustules on leaf.

E. pyri Pagnst. Hawthorn, mountain ash, white beam.
Also the cultivated "pear blister." On the first at Askham Bog.

(c) Pimples.

E. salicis Nal. Small, showing equally on both surfaces
Salix caprea mainly. Askham Bog.

E. tetanothrix Nal. On upper surface pedunculated. *S. pentandra, caprea, cinerea, aurita*. Askham Bog.

E. padi Nal. On upper surface, opening on lower.

E. similis Nal. On lower surface, opening on upper. Both on birdcherry and blackthorn.

E. macrochelus Nal. Larger, more scattered; hairs internal, pluricellular.

E. macrorrhyncus Nal. Smaller, much closer and more numerous: hairs internal and at orifice one-celled. Both on sycamore and maple.

E. tiliae Pgnst. On limes.

E. laevis Nal. On the blade.

E. nalepai Fckn. Always in axils of midrib and lateral veins.
Both on alder.

(d) Patches of coloured abnormal hairs or a less conspicuous felt.

E. tiliae var. *liosoma* Nal. Hairs cylindrical, gradually enlarged at extremity. Limes.

E. macrochelus Nal. Erinose form, "mushroom-headed" hairs. Sycamore and maple.

Phyllocoptes acericola Nal. In axils of veins, hairs club-shaped. Sycamore and maple.

E. brevitarsus Fckn. On alder. Askham Bog.

E. varius Nal. A felt on aspen. Askham Bog.

E. gibbosus Nal. A felt on brambles.

(e) Marginal rolling—(i) downwards tightly.

E. pteridis Moll. Bracken.

E. goniorthorax Nal. Hawthorn. Askham Bog.

E. galii Karp. Or upwards. Bedstraws, river bank above Selby.

(ii) upwards loosely.

Epitrimerus trilobus Nal. Elder.

(iii) upwards tightly.

Lioptypes atrichus Nal. *Stellaria graminea* and *S. glauca*.
On last. Askham Bog.

E. tuberculatus Nal. Tansy.

E. pilosellae Nal. *Hieracium pilosella*.

E. spp. On long-leaved willows, remaining green as yet undetermined.

E. tetrastrichus Nal. Short, small. Limes. *Pomisia tiliam-volvens* Rübs. makes a much larger one.

VI.—“WITCHES BROOMS.”

E. rufis Can. On birch.

E. avellanae Nal. On hazel.

ANGUILLULIIDÆ.

Although eelworms are of considerable economic importance, attacking most kinds of crops and wild plants, they have been little studied, and are insufficiently known. Their eel-like forms and microscopic size are sufficient for identification.

I.—STEM deformed, swollen, or both.

Aphelenchus fragariae Ritz-Bos. and *A. ormerodis* Ritz-Bos.

On cultivated strawberry. In the first the eelworms swarm in the tissues, and in the second between the sheath and the stems.

Tylenchus devastatrix Kuhn. Bulbous near base or higher up.

Some grasses (*Poa*, etc.), shepherd's purse, buckwheat, spurrey, beans, rye, oats, wheat, hops, hyacinths, ribwort, plantain, etc. Growth arrested and leaves deformed in purple and white clovers:

II.—ROOT nodosites mainly.

Heterodera radicicola Greeff and *H. schachtii* Schm. The one has an internal cavity, the other not.

H. radicicola. A large number of wild plants, cucumber, tomato, beet, cloves.

H. schachtii. The cruciferae, beet, hops.

III.—LEAVES.

- (a) *T. graminis* Hdy. Pustules on under surface. Sheep fescue grass.
- (b) Midrib: irregular swellings extending to blade and scape at times. *Tylenchus* sp. on dandelion and long-rooted cat's ear.

FUNGI.

Some of the parasitic fungi have the same effect on plants as the animal agents so far dealt with, that is, they cause increased growth and produce changes in the protoplasmic contents of the cells, and should

therefore be classed as galls. The masses of twiggy growths known as "witches brooms" are very conspicuous objects.

I.—“WITCHES BROOMS.”

Exoascus turgidus Sdbk. On birch, elm, oak, beech, lime, hawthorn, horse-chestnut, all of which the writer has seen in Yorkshire.

E. deformans Fckl. Cherry trees, blackthorn.

E. carpini Ros. Hornbeam. It occurs at Knaresborough.

II.—STEM SWELLINGS.

Epichloe typhina Pers. Fusiform, white at first. Grass spp.

Urocystis anemones Pers. Also midrib. Anemone and buttercups. “Buttercup smut.” Spores black-brown.

Cystopus candidus Lev. *Cruciferae* spp., with distortion.

Coniothyrium fockelii Sace. Elongated red patches, crack in winter with outgrowths of callus in the cracks. Bramble and dogrose.

Urocystis violae Sow. Also midrib. Violets.

Puccinia menthae Pers. Mints.

P. tumida Grev. Earthnut. In gall books wrongly assigned to *Æcidium bunii* D.C. or *P. bulbocastani* Fckl.

III.—ROOTS.

Plasmodiophora brassicae Wor. “Finger and toe” disease, cabbages, wallflower, wild radish. Nodular or warty outgrowths swollen and clubbed.

Frankiella alni R. Maire. Clustered, abnormally thickened roots.

IV.—FRUIT swollen and deformed.

Exoascus pruni Fckl. Blackthorn, bullace, bird cherry, plum.

V.—LEAVES.

Taphrina aurea Fries. Convex blisters on upper leaf, concavity golden yellow. Poplars.

Exoascus alnitorquus Winter. Leaf blister or pistillate catkins deformed. Alder.

Puccinia graminis Pers. Swollen spots, reddish above, yellow below. Barberry.

BOTANY OF EAST YORKSHIRE

By J. FRASER ROBINSON,
Author of Flora East Riding of Yorks., 1902.

PHANEROGAMS AND VASCULAR CRYPTOGAMS

IN the writer's "Flora of the East Riding of Yorkshire," published in 1902, the East Riding (Watsonian vice-county 61) is divided somewhat arbitrarily for the sake of botanical topography into seven areas. For the purposes of the present sketch, however, these will be grouped under three heads, which will have reference to the geological and edaphic conditions prevailing on the whole in each of them.

I.—HOLDERNESSE, not the seigniory merely, but all the district south and east of the Yorkshire Wolds, is a typical Boulder clay and Drift area, intersected by the River Hull and its many tributary waters, and includes Nos. 1 and 2 of the seven areas above referred to. This division is essentially a clayey one.

II.—THE WOLDS embrace Nos. 3 and 4, and constitute very different geological ground from that of Holderness. Here the foundation is chalk, which is nowhere covered by soil of great thickness; generally, indeed, even when cultivable, it is not more than a few inches in depth.

III.—THE PLAIN OF YORK, in its easternmost extension, and including the Pickering Carrs in the extreme north of the Riding, covers Nos. 5, 6 and 7.

"Derwentland," from the big tributary of the Ouse, which traverses this division from north to south, is the name we give to this part of the vice-county. Sand (siliceous) is the predominant constituent of the soil.

As an aid to the study of plant ecology, each of the three main divisions just adopted, and their physical characters briefly alluded to, is capable of elaboration, sub-division, and even further sub-division; and in the sequel will be so treated.

I.—HOLDERNESS.

Holderness (including part of Div. II.) has —

- (i.) Seacoast stretching from Filey to Spurn.
- (ii.) Northern shore of the Humber from Goole to Spurn, *i.e.*, in a direction approximately at right angles to the seacoast; and
- (iii.) The land behind (i.) and (ii.) that is bounded on the north and west by the Yorkshire Wolds (Chalk).

(i.) Of the sea coast taking

(a) the Boulder Clay cliffs of Filey and Bridlington Bays there is found a flora distinctly characteristic of clayey soils. Here, however, only those so-called pelophiles (clay affecting) that are more or less peculiar to the coast need be mentioned, *viz.*—

Ranunculus hederaceus, *R. Sardous*, *Geranium pusillum* and *G. sanguineum*, *Lotus corniculatus* var. *crassifolius*, *Rosa spinosissima*, *Parnassia palustris* (which, like the first species in this list affects wet places on the clay cap of the Flamborough Headland), *Dianthus gamander*, *Serrula tectoria*, *Cicinium Intybus*, *Plantago Coronata*, *Rumex sanguineus*, *Beta maritima*, *Agrostis alba*, *Equisetum maximum*, etc.

(b) The chalk cliffs of Flamborough Head yield many xerophiles (plants needing dry places), some of which, however, have a halophytic tendency—the fleshy character of many sand and seaside plants, *e.g.*, *Cochlearia officinalis* and *C. danica*, *Cerastium tetrandrum* and *C. arvense*, *Anthyllis vulneraria*, *Matricaria inodora* var. *maritima*, *Blackstonia (Chlora) perfoliata*, *Aira precox*, etc., whilst the plants of

(c) the sandy portion all along the seashore to the only local sand dune-like formation at Spurn, which concludes southwards the stretch of the East Riding sea coast, are mostly also sand affecting halophytes (salt plants). The following is a fairly characteristic sample of the species recorded for

SPURN.

Cakile maritima, *Silene maritima*, *Arenaria Peploides*, *Claytonia perfoliata*, *Trifolium arvense* and *T. scabrum*, *Eryngium maritimum*, *Calystegia (Convolvulus) Soldanella*, *Hippophae Rhamnoides*, *Carex arenaria*, *Phleum arenaria*, *Ammophila arundinacea*, *Triticum junceum* and *Elymus arenarius*. The last three are the grasses which, together with *Hippophae* above, with their extensive underground stem and root systems help materially in consolidating the four miles stretch of the sandy isthmus between Kilnsea and Spurn Head.

(i.) In this sub-division, the northern shore or left bank of the Humber comes under observation. For this purpose, however, instead of vertical, minor sub-divisions, as in the case of (i.), the estuarine shore may be taken in lateral, or longitudinal strips, which should assist in the ecological study thereof.

(a) The mudflats, often of great width, are for the most part submerged entirely except at times of ebb tide. No phanerogamic vegetation grows on the mud flats; but there is very much of the green-algal sort, notably *Vaucheria*, *Rhizoclonium*, *Enteromorpha*, etc. It is largely due to these algae that the instable mud is in the first instance brought to rest, and natural, organic warping begins (*vide* Robinson's "Flora E. R. Yorks.", p. 22). Here mention may be made of the only truly marine aquatic phanerogam, *Zostera marina*, beds of which occur in the Humber off Sunk Island and Spurn.

(b) The Salt Marsh, also of very considerable extent in many places, as at

WELWICK

consists of more compact mud than in the case of (a), and is richly covered with vegetation, being wholly or partially submerged only at times of the highest, or spring tides. This strip, it has been noticed, is that which is most affected by grazing cattle. The following is a florula of the salt marsh :

Cochlearia anglica, *Buda (spergularia) marina*, *B. media* and *B. neglecta*, *Aster Tripolium*, both the type and vars, *discoideus*, *Statice Limonium*, *Glaux maritima*, *Plantago maritima*, *Atriplex Portulacoides* dominant, and most abundantly so at Welwick 'Corner' *Suaeda maritima*, *Salicornia europaea*, *Triglochin maritimum*, *Scirpus maritimus*, *Glyceria (Poa) maritima* and *G. distans*.

(c) The salt meadow, the next strip inland, is no longer submerged except under special circumstances of wind and tide, having on an average an elevation of from 3 to 4 feet above

the salt marsh. Included with this meadow is the embankment, which keeps the water of the Humber within bounds from Selby and Goole to Kilnsea, near Spurn. The salt meadow seems to be preferred by horses, when they get the opportunity to graze upon it. Here the saltmarsh plants are in greatly



Photo by]

J. W. Dales, a.

BROUGH HAVEN.

diminishing frequency, whilst increasingly so are: *Armeria maritima*, some *Statice Limonium*, *Ruppia*—*stellata*—in pools of brackish water—*Juncus Gerardi* and rarely *J. compressus*, *Festuca duriuscula*, *Lepturus filiformis*, etc.

(d) The land side edges of the salt meadow, and both faces of the embankment present yet another group of plants, e.g., *Lepidium Draba* (C. alien here), *Trichium fragiferum*, *T.*

maritimum, *Bupleurum tenuissimum*, *Caucalis nodosa*, *Artemisia maritima* (abundant) and *Dipsacus sylvestris*. In brackish dykes and pools near the embankment will be found *Ranunculus Baudotii*, *Apium graveolens*, *Rumex maritimus*, more *Scirpus maritimus* and frequently the sedge, *Carex divisa*, whilst, again, on the dry embankment, *Plantago Coronopus*, *Atriplex littoralis* and *A. Babingtonii* and the three wild barley grasses, *Hordeum pratense*, *H. murinum* and *H. marinum* (the last rarely) also occur.

HOLDERNESS (Terrestrial).

(iii.) Holderness inland is a more or less level tract, generally not more than 10 to 15 ft. above sea level except in certain cases, to be mentioned shortly. The underlying rock is boulder clay and alluvial reassortment of the same, with quite a number of accumulations of glacial sands and gravels, which give rise to many minor elevations, rarely more, however than from 25 to 50 feet above sea level. These are the "hills," "holmes," "barffs," "broughs" (pronounced bruff) and "rises" that occur in so many Holdernessian place names; and it is due to these that Holderness, instead of being a dead level, is in places quite a pleasantly undulating region. Now well drained and almost entirely given up to cultivation, its pastures support great numbers of cattle and horses; whilst its arable land bears rich crops of wheat, beans, pulse, mustard, etc., as may be seen on that big tract of reclaimed land known as Sunk Island.

(a) The terrestrial wild plants of this part are largely clay affecting (pelophilous), and include:

Ranunculus Ficaria, *R. auricomus*, *Stellaria Holostea*, *Lychnis dioica*, *Ulex europaeus* (Furze) *Rubus cæsius* and *R. rusticanus*, *Epilobium hirsutum* and *E. parviflorum*, *Viburnum Opulus*, *Carum segetum*, *Conium maculatum*, *Daucus Carota*, *Eupatorium cannabinum*, *Helminthia echiooides*, *Tussilago Farfara*, *Pulicaria dysenterica*, *Convolvulus arvensis*, *Lysimachia nummularia* and *L. nemorum*, *Primula veris*, the Cowslip, very common, but *Primula acaulis*, the Primrose, not so frequent; *Solanum Dulcamara*, *Orchis mascula*, *O. Morio*, *Habenaria viridis*, *Tamus communis*, *Paris quadrifolia*, *Luzula sylvatica*, *Arum maculatum*, *Carex Goodenowii*, *C. flacca* and *C. panicea*, *Ophioglossum vulgatum* and *Equisetum arvense*.

No region anywhere would seem better adapted for the abundant growth of the Buttercups (*R. bulbosus* and *R. acris*), the common Daisy (*Bellis perennis*), as well as the Ox-eye (*Chrysanthemum leucanthemum*) and the common Dandelion (*Taraxacum officinale*), which, in late spring, everywhere enamel the meadows in white, green and gold. The Hawthorn (*Crataegus*), too, abounds in the East Riding, as well on chalk as upon clay, and often reaches the dimensions of a fairly-sized tree, particularly near very old towns and villages. Hedges of Hawthorn are the fences most prevalent in East Yorkshire,

and not stone walls. The Blackthorn sloes (*Prunus communis*), type and vars. *domestica* and *insititia*, are also very common, and when blossoming in hedgerow or coppice, as they and the hawthorn and other rosaceous species have done so profusely during the present late spring of 1922, the appearance was as if great snow wreaths had accumulated on the borders of the fields.

(b) Like islands of gravel, sand and dust in a sea of clay are those "hills," "holmes" and "barffs" spoken of above; and it is remarkable how the association of plants found thereon differs from associations elsewhere in Holderness. The plants, say, of Coneygarth and Brandesburton Barff are mostly xerophilous, and include the following :

Sisymbrium Thalaina, *Helianthemum Chamæistus*, *Polygala oxyptera*, *Hypéricum humifusum*, *Erodium cicutarium*, *Tritolium arvense*, *Astragalus danicus*, *Vicia lathyroides*, *Spiraea Filipendula*, *Poterium Sanguisorba*, *Anthriscus vulgaris*, *Marrubium vulgare*, the grass *Kæleria cristata* and the Moonwort fern, *Botrychium Lunaria*.

It is interesting to compare this list of species with that given for the sandy tracts of Div. III. or the Chalk, Div. II.; and it would almost seem to show that degrees of cohesion, porosity and other physical properties of the soil, rather than the mineral or chemical constituents thereof have most to do with determining the nature of a given plant association.

HOLDERNESS (Aquatic).

Next come under notice the aquatic conditions of Holderness, which are found to be of very considerable extent and variety. The River Hull with its tributaries, accomplishes most of the drainage of this division, although the fact is somewhat obscured now by the feeders of the River Hull being much artificialised as big open drains, two canals (aggregate length 10 miles), and a very large number of smaller artificial channels locally called "dikes." The larger drains—quite canal-like in width—have an aggregate length of nearly a hundred miles : whilst of their concomitant dikes, "hundreds" would be within the mark. In a word, Holderness has an intricate network of such channels ; and, in spite of periodic or spasmodic cleansing under Acts of Parliament of the past 600 years, they retain, in large numbers, lineal descendants of what would be the primitive, post-glacial vegetation. The watery places may be classified under :—

(a) River Hull and its tributary becks, larger drains and two short canals.

(b) Dikes (narrow, sluggish or stagnant drains), ponds, and one mere (natural lake)—Hornsea Mere—perhaps the largest of the four or five lakes of Yorkshire.

(c) Marshes, carrs and "ings," or damp grassy fields.

Although it would be quite possible to show that the grouping of the plants varies with the minor sub-divisions of (a), (b)

and (c) respectively, yet, for the present sketch, these must be lumped ; but the lists following do not claim to be exhaustive.

Of aquatic and sub-aquatic plants we have for (a) *Thalictrum flavum*, *Ranunculus circinatus*, *Nymphae lutea* (Yellow Water-lily), *Castalia speciosa* (White Water-lily), *Hippuris vulgaris*,



Photo by]

[J. W. Atkinson.

TROUT STREAM NEAR DRIFFIELD.

Ceratophyllum demersum, *Iris Pseudacorus*, *Alisma Plantago-aquatica*, *Sagittaria*, *Butomus* (handsomest of aquatics, dominant in parts of Keyingham and other drains), *Polygonum rufescens* and *P. lucens*, all except the first truly aquatic, whilst *Thalictrum* (Meadow Rue) and the sedges, *Carex vulpina*, *C. axillaris* (one tussock only in E. R. Yorks), *C. riparia* and *C. paludosa* are all noted river and drainside species.

(b) Dikes, ponds, and muddy places adjacent thereto hold another group or number of different groups, the dominating plants here being the *Batrachian Ranunculi* (Water Crowfoot or Water Buttercup). By far the commonest of these is *Ranunculus trichophyllus* var. *B. Drouetii*. Then follows very frequently *Ranunculus peltatus*, with two or three distinct varieties; and after it the sub-aquatics, *Ranunculus sceleratus*, *R. Lingua* and *R. Flammula*; the cresses, *Nasturtium officinale*, *N. palustre* and *N. sylvestre*, *Stellaria aquatica* (now almost, if not quite extinct), *Lychis Floscululi*, *Myriophyllum alterniflorum*, *Sium latifolium* and *S. erectum*, *Oenanthe fistulosa*, *O. Phellandrium*, *Senecio aquaticus*, *Hottonia palustris*, *Lysimachia Nummularia*, *Samolus valerandi*, *Menyanthes trifoliata*, *Myosotis palustris* and *M. repens*, *Utricularia vulgaris*, *Mentha hirsuta*, *Lycopus europaeus*, *Elodea canadensis*, *Stratiotes Aloides* (? extant), *Typha latifolia* and *T. angustifolia*, *Sparganium ramosum*, *S. simplex* and *S. natans*; all the "duckweeds" (Lemnæ), *Lemna polyrhiza*, *L. trisulca*, *L. minor* (the commonest, of course) and *L. gibba*, whose phyllodes frequently give a ruddy appearance to the surface of Keyingham Drain; *Alisma ranunculoides*, with a great array of the truly aquatic "pondweeds," e.g., *Potamogeton natans*, *P. polygonifolius*, *P. perfoliatus*, *P. crispus*, *P. densus*, *P. pectinatus* and *P. flabellatus*, *Zannichellia palustris*, *Carex Pseudo-cyperus*, and the grasses *Phragmites communis* (a perfect jungle near Hornsea Mere), *Phalaris arundinacea*, *Glyceria aquatica* and *G. fluitans*.

(c) Of marshy places, carrs, and "ings," which, roughly, are the three degrees from aquatic to terrestrial conditions *a.b.*, though there are various places called "bog" in Holderness, there are marshes, but no true turf or peat bogs existing to-day; we have yet another grouping of plants, of which, as a sample, take the following:—

Caltha palustris, *Viola palustris*, *Stellaria palustris*, *Hypericum tetrapterum*, *Lathyrus palustris*, *Lotus major*, *Potentilla palustris*, *Lythrum Salicaria*, *Lysimachia vulgaris*, *Menyanthes trifoliata*, *Pinguicula vulgaris*, *Salix triandra* and *S. pentandra*, *Epipactis palustris*, *Orchis incarnata*, *Juncus communis*, *J. glaucus* and *J. acutiflorus*, *Scirpus pauciflorus*, *Carex dioica*, *C. teretiuscula*, *C. paradoxa* (in several stations), *C. paniculata*, *C. muricata*, *C. filiformis* (? extant) and *C. vesicaria*—another remarkable array of sedges; *Calamagrostis Epigejos* and *C. lanceolata*—two fine small-leaved grasses; with finally the fern *Asplenium Thelypteris* and the horsetails *Equisetum palustre* and *E. limesum*. The "Pulten," or "Pulten Bog," near the River Hull, about four miles from Beverley, would furnish most of the above, including the *Lathyrus* (Marsh Pea), probably in its only Yorkshire station but one which has been added quite recently. The still more extensive marshy ground nearer the head waters of the river and near the River Hull

itself below Driffield has a similar florula, with the exception, so far as is known, of two or three of the rarer plants of those first enumerated. In one spot near Driffield, Kelly-thorpe, *Ranunculus Lingua*, *Schœnus nigricans*, *Carex paniculata* and *Lastreæa Thelypteris* grow together in great abundance.

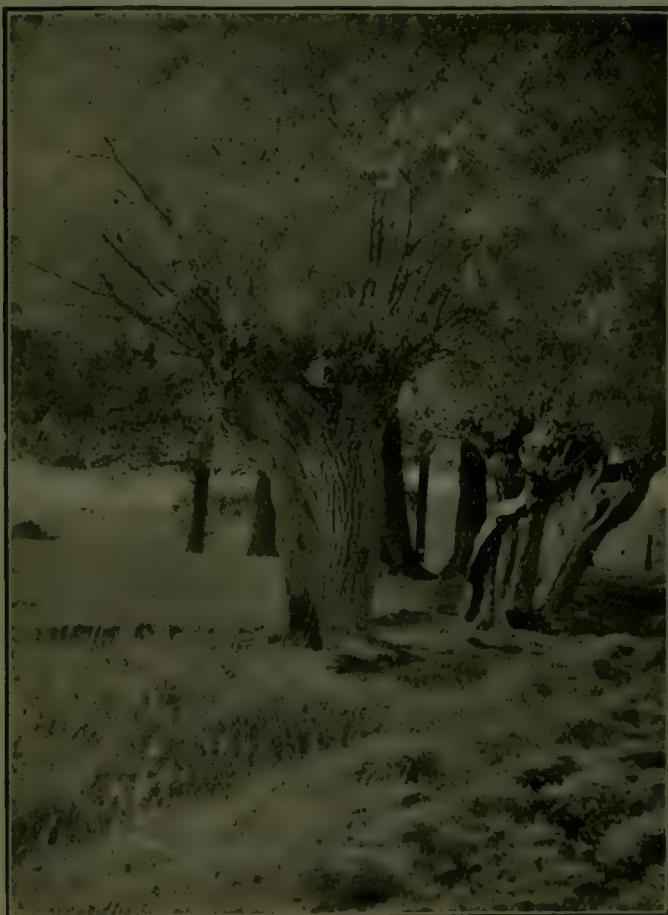


Photo by

[*J. W. Atkinson*

NEAR DRIFFIELD.

II.—THE WOLDS.

The Wolds, or hills which in their highest point—Wilton Beacon—reach an altitude of little over 800

feet above sea level, and whose average height is not half of that, bend round in a fairly broad band from Flamborough Headland, westwards and then southward to the neighbourhood of Hessle and North Ferriby, on the Humber. In great contrast to the preceding division, which is essentially clayey, the Wolds are chiefly of chalk, the Upper, Middle and Lower Formations of the Cretaceous System, together with the Red Chalk and Neocomian (Speeton Clay), all having exposures in this their most northerly English position. Around the western escarpment of the chalk and generally parallel to it is a series of what might be called "foothills." These are due to the outcrop of the Oolitic and Liassic rocks, whose debris forms some very good agricultural land in the neighbourhood of North and South Cave, Hotham and North Cliff. From the frequent sandiness of this part, and as it gradually merges into our Division III., it will be best to include its flora with that of "Derwentland." The Wolds consist of uplands, into which are cut more or less deeply many V-shaped dales, some having visible streams and ponds, but very frequently none of the former except round the base of the outcropping chalk strata, where many springs emerge generally from or near the Red Chalk.

The pasturage of the Wolds is rather poor, and the arable land, of which there is much, is only remunerative when it is highly farmed with the use of artificial manures, etc., oats and barley being the crops most successfully raised.

It is on the slopes of the Chalk dales and in their "bottoms" of chalk gravel that we have most of the interesting Xerophilous (dry loving) or Calcophilous (lime loving) species.

Characteristic of the Wolds (Div. II.), and often occurring in very great profusion, are the following:—

Reseda lutea, *Helianthemum Chamaecistus*, *Viola hirta*, *Epilobium angustifolium*, *Hypericum montanum*, *Prunus Avium* and *P. spinosa*, *Spiraea Filipendula*, *Fragaria vesca*, *Poterium Sanguisorba*, *Rosa arvensis*, *Pimpinella Saxifraga*, *Scabiosa Columbaria*, *Carduus nutans*, *C. eriophorus* and *C. acaulis*, *Picris hieracioides*, *Lactuca muralis*, *Centranthus rubra*, often clothing the faces of disused chalk-pits as at Hessle; *Campanula glomerata*, *Monotropa Hypopitys*, in symbiotic relation with fungus (mould) and roots of the Beech tree in woods; *Blackstonia (Chlora) persfoliata*, *Gentiana Amarella*, *Atropa Belladonna*, *Verbascum Thapsus*, *Origanum vulgare*, *Calamintha Acinos* and *C. Clinopodium*, *Thymus serpyllum*, *Fagus sylvatica*, the Beech (the tree *par excellence* of the Chalk), *Cephalanthera grandiflora*, *Epipactis latifolia*, *Orchis pyramidalis* and *O. ustulata*, *Ophrys apifera* and *Habenaria chlorantha*. Near Bridlington *Clematis vitalba* (Traveller's Joy) grows on the chalk, and probably in its most northerly, native British station. Except for *Carex præcox*, and one or two others like *Carex sylvatica* in woods, sedges are not common on the Wolds, but the grass *Brachypodium pinnatum* is very common, and only in this Division, whilst *Milium effusum* is frequently found. Neither the Ferns nor the Heath Order (*Ericaceæ*) are conspicuously present on the Chalk, except a little heather (*Calluna*) in one or two places as on Burton Agnes Wold, and, of course, the *Monotropa* given above, which, however, would scarcely at first sight be taken for a member of the heath family.

III.—“ DERWENTLAND, E. and W.”

“Derwentland, E. and W.,” and the most northern portion of the East Riding known as Pickering Carrs, constitute the final division of the vice-county under consideration. For the greater part, it is a tract of alluvial and blown sand which covers, often to a great depth, the underlying rocks of the New Red Sandstone (Triassic) which crop out from beneath the sandy accumulation conspicuously only at one place, the well-known eminence on which stands the church of Holme-on-Spalding Moor. Much of the area like that of Holderness, only more level and low lying, must

once have been marshy and fen-like—the name “Walling Fen” is still applied to a big tract in the south of Derwentland, E.—and this is evidenced by the very frequent marl pits that occur, as well as by the drains, dykes and canals that obtain to-day. Only in this division are there true Sphagnum bogs. Like Holderness, too, it is now well drained, and much of it under cultivation, the cereals, rye, barley and oats flourishing. Flax (*Linum*), though formerly to a greater extent, is still grown, whilst potatoes and the root crops, particularly carrot, turnip and mangold wurzel, with cultivated celery near the junction of Derwent and Ouse, could scarcely be grown to greater perfection.

Where cultivation has not yet claimed all the land, there remain patches, sometimes of considerable extent, that are still in their primitive condition; and with the numerous ponds and wet places already mentioned, afford some of the richest and most interesting botanical ground in the East Riding. Such spots will be found at Barmby and Holme-on-Spalding Moors, Market Weighton Great Sand Field, Hotham Carrs, and at Allerthorpe, Cliffe, Skipwith and Riccall Commons.

As sand (siliceous) is the predominating mineral in the soil and subsoil of the above named, naturally the flora is largely arenophilous (sand affecting), that is to say, xerophytic, not, however, of the same type exactly as the sand plants of the seaside, which are also halophytic (salt); nor yet of those on the chalk or the morainic gravels of Holderness (*vide* florula of “barffs,” *supra*).

Taking first the plants, many of which are not found in the Divisions I. and II., we have the following:

(a) Terrestrial : *Neckeria clavicularis*, *Teesdalia nudicaulis*, *Viola tricolor*, *Cerastium semi-decandrum*, *Silene noctiflora*, *Hypericum humifusum* and *H. pulchrum*, *Radiola linoides*, *Saxifraga tridactylites* and *S. granulata* (the only true Saxifrages in the E. R. Yorks., but the latter is very common, occasionally whitening over portions of Hotham Carrs), *Genista anglica*, *Cytisus scoparius* (common Broom, called "Ling" in E. R. plant-naming), *Ornithopus perpusillus*, *Vicia Lathyroides*, *Trifolium arvense*, *T. striatum*, *T. incarnatum* and *T. filiforme*, *Rubus fruticosus* in a dozen sub-species, *Bryonia dioica*, *Centunculus minimus*, *Centaurea pulchella*, *Gentiana campestris*, *Myosotis collina* and *M. versicolor*, *Calluna vulgaris* (Heather, of which there are acres on the sandy commons and only in this division. The variety *incana* is common at Skipwith). *Erica tetralix*, *E. cinerea* and *E. Mediterranea* recently discovered on Holme-on-Spalding Moor, *Pyrola minor*, *Scleranthus annuus*, *Rumex acetosella*, *Salix repens* (with vars. *ambigua*, *argentea*, etc., at Skipwith), *Pinus sylvestris*, *Goodyera repens*, *Habenaria bifolia*, *Juncus squarrosus*; the grasses *Aira flexuosa*, *Agrostis canina*, *Apera spica-venti*, *Sieglingia decumbens*, *Molinia varia*, *Nardus stricta*, and the ferns, *Blechnum spicant*, *Lastreæ cristata*, *L. spinulosa*, *L. Oreopteris* and *Botrychium Lunaria*.

(b) Aquatic, or sub-aquatics, too, will furnish a good list, and comprise, amongst many other, the undermentioned :—

Sagina nodosa, *Stellaria palustris*, *Peplis Portula*, *Hypericum elodes*, *Parnassia palustris*, *Drosera rotundifolia* and *D. intermedia*, *Anagallis tenella*, *Gentiana Pneumonanthe* (almost as abundant in drier places amongst heather on Skipwith Common), *Limosella aquatica*, *Veronica scutellata*, *Utricularia vulgaris*, *Pinguicula vulgaris*, *Mentha Pulegium*, *Littorella lacustris*, *Polygonum Hydropiper* and *P. minus*, *Rumex maritimus* and *R. limosus*, *Colchicum autumnale*, *Narthecium Ossifragum*, *Eleocharis acicularis* and *E. multicaulis*, a dozen or more species of fern, including *Lastreæ cristata*, *L. uliginosa* (?) and *L. Oreopteris* and *Osmunda regalis*.

The list may be brought to a close, notwithstanding its somewhat incomprehensive character, with mention of the solitary British member of the Marsiliaceæ ("Water-ferns"), *Pilularia globulifera*, which is still found in ponds on Skipwith and Cliffe Commons, together with the fact that no fewer than fourteen species of Sphagnaceous Mosses have been recorded for the East Riding, and chiefly from Skipwith and Riccall Commons.

The number of species of Phanerogams and Vascular

cryptogams recorded for the E. R. Yorks. to date is approximately 1050, and these, after Watsonian designation for "Types of Distribution," would work out something like the following :—

Type.	Whole of Britain.	East Riding alone.	
British	532	532	
English	409	201	
Germanic	227	28	
Atlantic	79	4	
Highland	120	—	
Scottish	81	20	
Intermediate	37	10	
Local	49	3	
	—	—	
Total	1525	Total	888
Aliens, Casuals, etc.	143
Incognita (now)	19
	—	—	—
Grand Total for E.R. Yorks.	1050		

NON-VASCULAR CRYPTOGAMS

Although no work has yet appeared that is specially devoted to the lower cryptogamic flora of the East Riding, as has been the case for the phanerogams, yet very much attention has been paid to the subject in its various branches, both by contemporary and former workers whose records may be found embodied in many published proceedings. Notably of these may be mentioned the proceedings that have, at one time and another, been issued under the auspices of the Yorkshire Naturalists' Union; as, for example, the following :—

"The Alga-flora of Yorkshire," by W. West, F.L.S., and G. S. West, B.A., A.R.C.S., published in 1901, which contains many records of the fresh water algae found in the East Riding; and the second and revised edition of J. G. Baker's "North Yorkshire," 1905,

by the late Matthew B. Slater, which gives a very full account of the North Yorkshire Hepaticæ, should incidentally, be of great service to one investigating the Liverworts of East Yorkshire.

To Robinson's "Flora of the East Riding Yorks.," published in 1902, there is an appendix to the phanerogamic and higher cryptogamic portions from the pen of Mr. J. J. Marhsall, formerly of Beverley and Market Weighton, which deals specially with the *Sphagnaceæ* and *Musci veri* (True Mosses), enumerating some two hundred species thereof. But the best account of the mosses, and particularly of the *Sphagnaceæ*, will be found in a collation that could be made of the work of Wm. Ingham, Esq., B.A., together with that of his enthusiastic co-helpers of the City of York. Mr. Ingham contributes the fairly exhaustive account of the lower cryptogamic flora of an extensive area round York to the British Association "Handbook to York and District," edited by G. A. Auden, Esq., M.A., M.D. (Cantab.), and prepared for the Seventy-fifth Meeting, held in York in 1906; and it is from this that much of the following information is obtained, our sincere thanks being tendered to Mr. Ingham for use of the same.

I.—FRESHWATER ALGÆ.

If the *Diatomaceæ*, an order not now so much affected, as it was when the British Association last met at Hull, may be included here, then there is a big field for the botanical microscopist to survey. The open drains and dikes so numerous, alike in Holderness and Derwentland, together with the chalk springs and becks, and the ponds of both of these areas, simply

abound with a very great variety of genera and species of Diatoms.

A full account thereof will be found in Mill's and Philip's exhaustive and finely illustrated paper in the *Proceedings of the Hull Scientific and Field Naturalists' Club* (q.v., Vol. I., part IV., 1901). The late R. H. Philip carried on long after their date until 1913, when his own death occurred, the work of those pioneer diatomists of Hull in the sixties of last century, whose names are enshrined in *Odontidium (Fragillaria) Harrisonii*, *Aulacodiscus Sollitianus*, *Amphora Normanii* etc. *Odontidium Harrisonii*, the first-named of which, a beautiful, cruciform diatom still survives, more profusely, perhaps, than anywhere else in the world, in a bubbling spring ("Lady's Well"), growing attached to siliceous sand grains, not over a couple of miles from the city. Philip's list in the Proceedings above-mentioned comprises no fewer than 600 species and varieties of Diatomes.

In the East Riding generally, many of the unicellular algae like *Pandorina*, *Volvox globator*, and very numerous species of *Desmids*, are found, and in the article by Mr. Ingham, referred to above, it is stated for ponds on Skipwith Common that the following algae were recorded as new to British Isles in 1901: - *Scenedesmus Hystrix* Lagerh., and *Lynghya Lagerheimii* (Moëbius) Gomont.

Of the filamentous algae also, a large number have been determined, and include several species of *Vauucheria* (notably *V. dichotoma* var. *sub-marina*, of which mention has been made above (q.v., phanerogamic article), *Enteromorpha* (in brackish water near the Estuary), *Spirogyra*, *Clostrix*, *Zygnema*, *Edogonium*, *Stigeoclonium*, *Drapetnaldia*, *Batrachospermum*, etc.

II.—FUNGI.

Owing to the great variety of members of this class that have been observed, gathered and delineated, but not always fully determined, both in clayey Holderness, and on the sandy commons of Derwentland, it would seem that the vice-county affords a very rich supply of Fungi, including a large number of the less known British species, e.g.—

Lepiota felina, *Tricholoma onychinum*, *Volvaria gloiocephala*, *Paxillus orcelloides*, *Russula sardonia* and *R. purpurea*, *Nyctalis parasitica* on *Russula nigricans*, all in the neighbourhood of Escrick; and *Gomphidius roseus*, *Lactarius cilicioides*, *Panus conchatus* and *Hypomyces rosellus* parasitic upon *Poria medulla-panis* from near Selby and Skipwith.

Pocklington, from which another portion of the great sandy tract, namely, Allerthorpe Common, may be visited, has yielded a large number of Agarics, amongst the least common being the following:—*Lepiota felina*, *Tricholoma columbetta*, *Collybia nitellina*, *Pluteus hispidulus*, *Inocybe plumosa*, *Agaricus comp-tulus*, *Hypholoma epixanthum*, *Lactarius fuliginosus*, *Russula Queletii*, *Boletus alutarius* and *B. porphyrosporus*.

From personal observation and collection in Holderness, on the Wolds, and on the eastern edge of Derwentland, the following larger Fungi, without order or specific name, may be mentioned:—*Morchella*, *Mutinus*, *Phallus*, *Geaster*, *Hypoxyylon*, many of the greater *Polyporaceæ*, a near relative of the truffles on places where wood has been burnt in the chalk plantations, two or three species of *Coprinus*, the bird's nest fungus, the Jew's-ear and quite a number of the larger species of the Discomycetes, etc., etc.

It may not be inappropriate here to include the remarkable group of organisms known as *Mycetozoa* or *Myxomycetes* (the Slime Fungi) of which, in *Proceedings of Hull Scientific and Field Naturalists' Club*, Vol. III., beginning at page 100, there is a good, systematic account by T. Petch, Esq., B.A., and B.Sc. (Lond.). His list, made in the first years of the present century, before he left Yorkshire and took up an appointment at the Royal Gardens in Ceylon, comprises sixty-five species of the *Myxomycetes*, all found at no great distance from Kingston-upon-Hull.

For a fuller account of the East Yorkshire fungi, again a publication of the Yorkshire Naturalists' Union may be consulted, viz., "The Yorkshire Fungus Flora," by G. Massee and C. Crossland, 1905.

III. HEPATICA OR LIVERWORTS.

The damper spots in all parts of the East Riding afford a larger number of Liverworts, the Marchantiales predominating in clayey Holderness, whilst the pools and channels of the sandy commons favour those that more properly come under the Jungermanniales. Chiefly in the wet bottoms of pits that have been excavated in the morainic gravels of Holderness, as well as by the shady sides of natural becks, may be found, often very plentifully, the following genera : *Marchantia*, *Conocephalum*, *Lunularia*, *Pellia*, etc., and still, in pools on Figham Common (Holderness), *Ricciocarpus natans* occurs in abundance.

It is, however, the sandy tracts, especially those of Skipwith Common and Barnby Moor, which show a much more extended list of Hepatics, including the following : *Riccia sorocarpa* and *R. fluitans*, *Ricciocarpus natans*, *Conocephalum conicum*, *Lunularia*

cruciata, *Marchantia polymorpha*, *Aneura pinguis* and *A. sinuata*, *Metzgeria furcata*, *Pellia epiphylla*, *Fossombronia Dumortieri* and *F. Wondraczekii*, *Haplomitrium Hookeri*, found by Spruce in 1842 at Barmby Moor, but not since detected there; *Nardia scalaris*, *Aplozia crenulata*, and *A. riparia*, *Lophozia inflata*, *L. ventricosa* and *L. gracilis*, *Mylia Taylori* and *M. anomala*, *Lophocolea cuspidata* and *L. heterophylla*, *Chiloscyphus polyanthos*, *Cephalozia connivens*, *C. lunulæfolia* and *C. Francisci*, *Cephaloziella byssacea* and *C. Curnowii*, *Odontoschisma sphagni* and *O. denudatum*, both from Barmby Moor, with *Kantia Trichomanis*, *K. sprengelii*, *Lepidozia setacea* and *Ptilidium ciliare*, all except the second from the same part; *Diplophyllum albicans* and *D. obtusifolium* (both Langwith), *Scaparia irrigua* (Skipwith), and *Frullania dilatata* at North Grimston.

IV.—SPHAGNACEÆ—PEAT OR BOG MOSES.

Alone of the three larger divisions of the East Riding of Yorkshire, that which is designated “Derwentland E” has anything approaching peat or sphagnum bog, in the correct sense of the term; and it is in the many shallow pools on the sandy commons of Skipwith, Allerthorpe and Barmby Moor where the same may be found. For Skipwith, the account of the Sphagnaceæ given by Mr. Ingham in the Handbook already referred to, is so exact and comprehensive that, without further apology, it is herewith quoted in its entirety:—

“ Skipwith Common is the best ground. About thirty minutes’ walk from Riccall Station, and on the Common to the right of the path, is a shallow pool filled with *Sphagnum rufescens* Warnst. Along the edge of the pool is the rare *S. fimbriatum* var. *robustum* Braithw., of yellow colour, and fruiting abundantly. *S. subnitens* var. *flavescens* Warnst. also

grows here. In the wide ditch, about ten minutes farther forward, are large dark masses of *S. crassicladum* Warnst. On the borders of the largest pool, about twenty minutes farther, are the following interesting sphagna:—*S. cymbifolium* var. *fusco-flavescens* Russ., and var. *pallescens* Warnst. The vars. *glaucescens* Warnst. (the common var. of *cymbifolium* in Yorkshire) and *glauco-pallens* Warnst., grow in drier places on the Common.

"The beautiful *S. papillosum* var. *sublaeve* Limpr., forma *glaucescens*, is also near this pool. *S. inundatum* Warnst. grows submerged. On the drier parts of the Common are the rare *S. contortum* (Schultz) Limpr., and *S. compactum* DC., with its two varieties, *subsquarrosum* Warnst. and *imbricatum* Warnst. The rare *S. subsecundum* Limpr., and *S. molluscum* forma *compacta* Warnst., grow in wet places among grass and heather. Large masses of *S. cuspidatum* var. *submersum* Schimp. of a rich yellow colour form the beds of two shallow pools near the large pool. These shallow pools dry up after a hot summer, and this fine bog-moss then forms a springy carpet on crossing them. In wet places away from the water is the other var. of *S. cuspidatum*, viz., var. *falcatum* Russ. The type of this *Sphagnum*, all dark green may be seen under water in the largest pool. Among the heather, in various places, grow three more varieties of *S. subnitens*, viz., var. *flavo-rubellum* Warnst., fruiting abundantly; var. *griseum* Warnst.; and var. *virescens* Warnst."

Mr. Ingham further states that on Barmby Moor, near Pocklington, growing amongst tall grass are *Sphagnum cuspidatum* var. *falcatum* Russ., *S. subsecundum* Limpr., and *S. compactum* var. *subsquarrosum* Warnst. Also, "On the Moor, fifteen minutes' walk beyond the White Horse at Kilburn, is a very fine growth of *S. cuspidatum* var. *submersum* Schimp., chocolate coloured, and with very long, floating stems, the plant being much like *S. torreyanum* in habit. Near this is *S. papillosum* var. *normale* Warnst."

V.—MUSCI VERI—TRUE MOSES.

The East Riding is low lying, and nowhere over 810 feet above sea level. It is entirely within the infra-agrarian zone of H. C. Watson, and this, together

with the entire absence of montane, or even sub-montane streams, and the comparatively dry state of its atmosphere, the annual rainfall being about the same as that of East Anglia, which is the lowest in Britain, does not conduce towards its having a large or copious moss flora. Still, the class is fairly well represented, and in the past, has had many notable students even in East Yorkshire. Among these may be mentioned the late R. Spruce and Matthew B. Slater, of Malton, who often visited and recorded much concerning the bryology of the vice county. Twenty-five years ago Mr. J. J. Marshall, Pharmacist, late of Market Weighton and Beverley, was at work in this field, giving great attention to the mosses thereof; and it was due to his observations and records that so copious a list—200 species and varieties—appears as an appendix to Robinson's "Flora of the East Riding Yorks.", published in 1902. To-day, this list remains by far the fullest account so far as records of mosses and their stations are concerned for the area under consideration. Moreover, of late years, Mr. Marshall's good work has been confirmed and considerably augmented by Mr. Wm. Ingham, B.A., and his bryological co-workers of the City of York.

So interestingly, indeed, has Mr. Ingham written of our local mosses, that liberty is again taken to quote his remarks in full from the Handbook (British Association) above mentioned. Speaking of Skipwith, which again must be put in the forefront as regards the non-vascular cryptogams, he says:—

" Skipwith Common is remarkable for its extensive growth of the Harpidioid Hypna.

" In the largest pool float large intricate masses of *Hypnum fluitans* var. *gracile* Boul., with stems more than a foot in length, and seta four and seven-eighths inches long. At the side of

the pool are large tufts of the pale green *H. fluitans* var. *atlanticum* Ren.; and of var. *Jeanbernati* Ren. forma *Hollerii* (San.) Ren.

" In the narrow drainage channels from the pools are large golden-coloured masses of *H. fluitans* var. *Arnelli* Sanio.

" Two smaller pools near have their beds formed by intricate carpets of *H. fluitans* var. *Jeanbernati* Ren. forma *elata* ad var. *elatum* Ren. et Arn. *transiens*. This moss, together with *Sphagnum cuspidatum* var. *submersum*, forms a mossy carpet over the pools after a dry summer.

" *H. fluitans* var. *gracile* forma *laxifolia* Ren. is among the wet grass and heather; as also the var. *falcatum* Schimp.; and *Hypnum exannulatum* var. *pinnatum* Boul., forma *graciliscescens* Ren., and forma *polyclada* Ren.; also two forms of var. *brachydictyon* Ren.

" In another pool are golden-coloured tufts of var. *falcifolium* Ren., of the sub. group *Rotae* of *Hypnum fluitans*.

" A striking feature of the Common is the extensive mass, many square yards in extent, of the large and rare golden-coloured moss, *Hypnum lycopodioides* Schwgr. Near it are the handsome *H. Wilsoni* Schimp.; *H. Sendtneri* Schimp.; *H. revoluta* Sw.; *H. falcatum* Brid.; *H. intermedium* Lindb.; *H. giganteum* Schimp.; *H. cordifolium* Hedw., fruiting abundantly; *H. stramineum* Dicks., in extensive patches; *H. elodes* Spruce; *H. stellatum* Schreb.; and *H. polyganum* Schimp. var. *stagnatum* Wils.

" The genus *Campylopus* here is interesting. *C. flexuosus* has a form intermediate with *C. pyriformis*, and the latter species has an interesting form intermediate with *C. flexuosus*. *C. flexuosus* var. *paradoxus* Husn., grows on the bare turf, as also *C. fragilis* B. & S., and the interesting black and green var. *muticus* of *C. atrovirens*. Among the heather are compact tufts of *C. brevipilus*.

" *Dicranum spurium* Hedw.; *D. Bonjeani* var. *rugitolum* Bosw., and *Hypnum imponens* Hedw., are rare mosses growing amongst the heather."

Space will not allow of a fuller list, and only a selection of the least common true mosses of the East Riding will now be given to complete this brief survey of its bryology.

(S.C.), (L.M.), (M.W.), (B.M.), (K.B.) or (K.M.) after the record is meant to indicate respectively, Skipwith Common, Langwith Moor, Market Weighton, Barmby Moor, Kilburn, or Kirkham.

Polytrichum nanum Neck. (S.C.), (L.M.) and (M.W.).

- P. commune* var. *fastigiatum* (Lyle) Wils. (S.C.).
Archidium alternifolium Schp. (L.M.).
Pleuridium alternifolium Schp. (L.M.) and (M.W.).
Seligeria pusilla B. & S. (K.B.).
S. paucifolia Cair. (M.W.), Goodmanham.
S. calcarea B. & S. (M.W.), and in all railway cuttings
in chalk.
S. recurvata B. & S. (K.B.).
Ceratodon conicus Lab. (K.B.).
Dicranum undulatum Ehrh. (M.W.), Holme Wood.
D. spurium Hedw. (S.C.) and (B.M.).
Fissidens exilis Hedw. (K.M.).
F. bryoides var. *inconstans* Schp. (K.M.).
Rhacomitrium lanuginosum Brid. (S.C.).
Ptychomitrium polyphyllum Furnr. (K.M.).
Pottia bryoides var. *pilifera* Schp. (B.M.).
P. Starkeana C.M. (K.M.).
Tortula ambigua Ang. (K.M.).
T. papillosa Wils. (M.W.).
Weissia crispa Mitt. (M.W.).
W. tenuis C.M. At Birdsall.
Ulota phyllantha Brid. (M.W.).
Orthotrichum pulchellum Sm. At Birdsall.
Ephemerum serratum Hampe. (M.W.).
Physcomitrella patens B. & S. (S.C.).
Funaria fascicularis Schp. (L.M.).
Thuidium recognitum Ldb. (M.W.).
Cylindrothecium concinnum Schp. (M.W.).
Pylaisia polyantha B. & S. (M.W.).
Brachythecium salebrosum B. & S. (K.M.).
Eurhynchium crassinervium B. & S. At North
Grimston.
Plagiothecium latebricola B. & S. (K.B.).
Amblystegium irriguum B. & S. Birdsall.

Hyphnum aduncum var. *diversifolium* Ren. At Selby.
H. aduncum var. *tenuis* Ren. At Barlby, near Selby.
H. molluscum var. *fastigiatum* Bosw. (K.B.).
H. palustre var. *Paxum* B. & S. At Buttercrambe.
H. giganteum Schp. At Warthill.

Hyphna, in addition to the last four records, will be found mentioned in Mr. Ingham's notes above, which are introductory to the list just given.

DIATOMACEÆ OF EAST YORKSHIRE

By FREDERICK WM. MILLS, F.L.S., F.R.M.S.

THE Diatoms found in the Hull district have been studied by a number of diatomists since the time of George Norman, of Hull, who published, in 1859, his "List of Diatomaceæ occurring in the neighbourhood of Hull," and a revised and extended "List" in 1865. He is well known to the microscopical world through his published labours in the field of the Diatomaceæ. In addition to his excellent local lists already referred to, he was the author of the following papers :—

- " Notes on some new and rare Diatomaceæ from the Stomachs of Ascidians." *Ann. and Mag. Nat. Hist.*, 1858, page 158.
- "On *Rhizosolena*." *op.cit.*, 1858, page 158.
- " On some undescribed species of Diatomaceæ." *T.M.S.*, 1861, page 5.
- " Diatomaceous Deposits." *Q. J.M.S.*, 1868, page 218.
- " Hunting for Diatomaceæ." *Intell. Observ.* [no date].

Although the study of Diatoms was such a favourite one with so many microscopists during Norman's time, he was able to make several additions to the then known species. Some which he found were

named after him; others he named in honour of his friends and fellow-workers, J. D. Sollitt and R. Harrison; for example, there are *Coscinodiscus Normani*, *Pleurosigma Normani*, *Odontidium Harrisonii*, and *Aulacodiscus Sollittianus*.

My late friend, Robert Harris Philip, and myself revised Norman's list and added to it new species since found in the district. In the identification of Norman's records we were greatly assisted by the permission of the authorities of the Hull Municipal Museum to inspect the slides formerly forming his collection and now in the Museum.

The comparison of these slides with present day gatherings leads to some noteworthy considerations. The first is, perhaps, the great industry and patience of Norman and his contemporary microscopists, as evidenced by the number of localities they have examined, and the exhaustive lists from each place. The next most striking fact is the remarkable fixity of certain species in certain localities. More than sixty years have passed since Norman and Harrison made their records, but still the springs of Newbald yield *Melosira arenaria*, and those of Haltemprice *Fragillaria Harrisonii*, in each case the only localities in this district where these forms are found in quantity. And now, as in those days, all Humber gatherings still contain *Pleurosigma angulatum*, *Amphiprora alata* and *Nitzschia sigma*, with its varieties. Side by side with these we find other cases, illustrative of the apparently capricious appearance and disappearance of certain species which every diatomist must have experienced. For instance, in the Wold springs of Newbald and Weedley, *Diatoma hyemale* is now a fairly common form, but it is not

recorded by Norman, or to be found on any of Norman's slides, although he made many preparations from localities where it may be found to-day. A converse case of disappearance is shown in Norman's "*Amphiprora constricta*," which appears to be *Stauroneis amphoroides* Grün., though it is not exactly typical. This seems to have been not uncommon in Norman's time in the docks of Hull and Grimsby, but is now absent. *Navicula peregrina* and *N. digito-radiata* var. *Cyprinus*, common in most of Norman's slides of brackish water forms, are much scarcer now.

The following list includes a few forms on the authority of the "Alga Flora of Yorkshire," by W. West, F.L.S., and G. S. West, A.R.C.S., and others recorded in *The Naturalist* by various collectors.

As regards the extent of country to be considered as the "Hull District," we have followed Norman in not confining ourselves too closely to the immediate neighbourhood of the City. His records comprise gatherings from places, in a few cases, as far distant as Harrogate and Whitby. Speaking generally, we have assumed any place to be in the district that is within reach of a half-day excursion from Hull. The only species we have omitted from his list are those he records on ships' bottoms from foreign parts, as these cannot fairly be considered local. Early in our work, the question arose as to whether we should be justified in including species which Norman found only in the stomachs of Ascidian Molluscs, adhering to oyster shells bought in the Hull market, but the evidence being conclusive that these were dredged up from the North Sea, and the fact that we have found many of

these Ascidian species on the shores of the Yorkshire coast and in the Humber estuary, renders it pretty certain that the whole of them may be found, after more numerous observations, within our limits. Norman regretted not having been able to make many gatherings from the sands of the sea shore, and unfortunately we have to express the same regret. The conditions under which gatherings may be made from marine sands are so fugitive that opportunities of making them are exceedingly scarce.

Our material from the North Sea is somewhat scanty. It consists merely of a few Ascidian gatherings examined by Norman, some plankton diatoms on the authority of Prof. T. P. Cleve, and a deep sea sounding. A careful perusal of Prof. Cleve's works on the plankton of the North Sea and neighbouring waters will afford much valuable information as to the seasonal distribution of the numerous diatoms inhabiting them. We have, however, thought it desirable only to record the forms found by him in a gathering taken near the Yorkshire coast at long. 0° 5' W., lat. 55° 20'.

The plankton diatoms are of great interest, and teach us much about oceanic currents. The neritic (littoral) forms are in many cases varieties of the oceanic, and pass suddenly from one to the other—e.g., *Rhizosolenia alata* becomes changed into *R. gracillima*, and it is not an uncommon occurrence to find a specimen one half of which is typical of *R. alata* and the other half of *R. gracillima*. Again, the northern varieties on inhabiting more temperate waters change their appearance, as *Coscinodiscus oculus iridis* of the Arctic Ocean becomes *C. concinnus* of the North Sea.

LIST OF DIATOMACEÆ FOUND IN THE HULL DISTRICT.

Sub-family RAPHIDIEÆ.

Tribe Cymbelleæ.

- Amphora ovalis* Kütz.
A. ovalis v. *gracilis*.
A. ovalis v. *affinis* Kütz.
A. ovalis v. *pediculus*.
A. Normanii Rab.
A. Proteus Greg.
A. arenaria Donk.
A. angulosa V. H.
A. angulosa v. *oblongella* Cl.
A. crassa Greg.
A. acutiuscula Kütz.
A. salina W. Sm.
A. costata W. Sm.
A. coffeeæformis Kütz.
A. inflexa (Berb.) H. L. Sm.
A. turgida Greg.
A. veneta Kütz.
A. lineolata Eh.
A. commutata Grun.
A. hyalina Kütz.
A. lævissima Greg.
A. ostrearia Breb.
A. ostrearia v. *quadrata* Breb.
A. fusca A. S.
Cymbella Ehrenbergii Kütz.
C. cuspidata Kütz.
C. cuspidata v. *naviculiformis*.
C. amphicephala Næg.
C. obtusa Greg.
C. affinis Kütz.
C. leptoeeras Kütz.
C. microcephala Grun.
C. æqualis W. Sm.
C. gastoïdes Kütz.
C. lanceolata Eh.
C. cymbiformis Eh.
C. cymbiformis v. *parva*.
C. cistula Hemp.
C. cistula v. *maculata*.
C. Helvetica Kütz.
Encyonema prostratum Ralfs.
E. turgidum (Greg.) Grun.
E. cæspitosum Kütz.
E. cæspitosum v. *Auerswaldii*.
E. ventricosum Kütz.

E. gracile Rab.*E. gracile* v. *scotica*.

Tribe Naviculeæ.

- Mastogloia Smithii* Thw.
M. Smithii v. *lacustris*.
M. lanceolata Thw.
M. apiculata W. Sm.
M. Danseii Thw.
M. Danseii v. *elliptica* Ag.
M. Grevillei W. Sm.
M. Gallica W. Sm.
Stauroneis Phenicenteron Eh.
S. gracilis Eh.
S. acuta W. Sm.
S. Gregorii Ralfs.
S. spicula Hick.
S. salina W. Sm.
S. anceps Eh.
S. anceps v. *linearis*.
S. anceps v. *amphicephala*.
S. Smithii Grun.
S. Legumen Eh.
S. amphoroides Grun.
Pinnularia nobilis Eh.
P. major Kütz.
P. viridis v. *commutata*
P. hemiptera Kütz.
P. cardinalis Eh.
P. rectangulata v. *Stauntoniae*
P. cruciformis Donk.
P. quadrarea A.S.
P. pseudo-retusa Per. (N.
retusa V.H. nec. Breb.)
P. gracillima Greg.
P. undulata Greg.
P. lata Breb.
P. borealis Eh.
P. Rabenhorstii Grun.
P. divergens W. Sm.
P. sublinearis Grun.
P. retusa Breb.
P. Hilseana Jan.
P. Brebissonii Kütz.
P. stauroptera v. *parva*.
P. tabellaria Eh.
P. gibba Kütz.

P. subcaeruleata Greg.
P. appendiculata Ag.
P. globiceps Greg.
P. mesolepta Eh.
P. interrupta W. Sm.
P. brevicostata Cl.
P. nodosa Eh.
P. nodosa v. *formica*.
P. clavicularis Greg.
P. blanda A. S.

Genus *Navicula*.

Radiosæ.

Navicula oblonga Kütz.
N. peregrina Kütz.
N. peregrina v. *Merisculus* Schum.
N. salinarum Grun.
N. cincta (Eh.) Kütz.
N. gracilis Eh.
N. gracilis v. *schizonemoides* V. H.
N. vulpina Kütz.
N. viridula Kütz.
N. viridula v. *Slesvicensis*.
N. radiosa Kütz.
N. radiosa v. *tenella*.
N. cryptocephala Kütz.
N. cryptocephala v. *exilis*.
N. cryptocephala v. *veneta*.
N. rhyncocephala Kütz.
N. rhyncocephala v. *rostellata*.
N. gregaria Donk.
N. Hungarica Grun.
N. Hungarica v. *capitata*.
N. costulata Grun.
N. nana Greg.
N. cancellata Donk.
N. crucifera Grun.
N. inflata (Greg.) Ralls.
N. fortis Greg.
N. digitio-radiata v. *Cyprinus*.
N. Reinhardtii Grun.
N. Reinhardtii v. *gracilior* Grun.
N. distans (W. Sm.) V. H.
N. lanceolata Kütz.
N. Gastrum (Eh.) Donk.
N. Gastrum v. *exigua*.
N. Anglica Ralls.

N. Anglica v. *subsalina*.
N. semen Eh.
N. diaphala W. Sm.
N. directa W. Sm.

Didymæ.

Navicula Crabro v. *Pandura* Breb.
N. interrupta Kütz.
N. didyma Eh.
N. Bombus Eh.
N. apis Donk.
N. vacillans A. S.

Ellipticæ.

Navicula Smithii Breb.
N. Smithii v. *aestiva*.
N. litoralis Donk.
N. nitescens Greg.
N. fusca Greg.
N. suborbicularis Greg.
N. suborbicularis v. *coffeeaeformis* A. S.
N. elliptica Kütz.
N. elliptica v. *ovalis*.
N. elliptica v. *oblongella*.
N. elliptica v. *minima* (N. *Puella* Cl.)
N. hyalina Donk.

Lyratæ.

Navicula Lyra Eh.
N. Lyra v. *elliptica*.
N. abrupta Greg.
N. forcipata Grev.
N. pygmaea Kütz.

Hennedyæ.

Navicula Hennedyii W. Sm.

Asperæ.

Navicula aspera Eh.
N. clepsydra Donk.

Stauroneideæ.

Navicula Tuscula Eh.
N. mutica Kütz.
N. mutica v. *undulata*
N. mutica v. *quinquenodis*.

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N. crucicula Donk.

N. integra W. Sm.

N. protracta Grun.

Palpebrales.

Navicula palpebralis Breb.

N. palpebralis v.

Barkhayana Greg.

Abbreviatæ.

Navicula brevis Greg.

N. elegans W. Sm.

N. elegans v. *cuspidata* Cl.

Perstriatæ.

Navicula humerosa Breb.

N. latissima Greg.

N. scutelloides W. Sm.

N. granulata Breb.

N. Baileyana Grun.

N. confervacea Kütz.

N. Scandinavica (Lag.) A.S.

N. pusilla W. Sm.

N. Schumanniana Grun.

N. marina Ralps.

Johnsonieæ.

Navicula scopulorum Breb.

Crassinerves.

Navicula cuspidata Kütz.

N. cuspidata f. *craticula*.

N. halophila Grun.

N. ambigua Eh.

N. ambigua f. *craticula*.

Fusiformes.

Navicula fusiformis v. *ostrearia*.

Sculpteæ.

Navicula sculpta Eh.

N. Bohemica Eh.

N. sphærophora Kütz.

Seriateæ.

Navicula serians Breb.

N. exilis (Kütz.) Grun.

N. follis Eh.

Formosæ.

Navicula formosa Greg.

N. Liburnica Grun.

N. probabilis A. S.

N. latiuscula Kütz.

N. amphisaena Bory.

N. amphisaena v. *subsalina*.

Limosæ.

Navicula limosa Kütz.

N. limosa v. *gibberula*.

N. limosa v. *curta*.

N. ventricosa Donk.

N. fontinalis Grun.

Affines.

Navicula bisulcata Lang.

N. Iridis Eh.

N. Iridis v. *amphigonphus*.

N. Iridis v. *amphirhyncus*.

N. Iridis v. *dubia*.

N. Iridis v. *undulata*.

N. Iridis v. *affinis*.

Lineares.

Navicula liber W. Sm.

Bacilleæ.

Navicula bacillum Eh.

N. bacilliformis Grun.

N. lævissima Kütz.

N. obtusa W. Sm.

N. Pupula Kütz.

Minutissimæ.

Navicula incerta Grun.

N. seminulum Grun.

N. atomus Næg.

N. cocconeiformis Greg.

N. exilissima Grun.

N. binodis (Eh.) W. Sm.

N. lepidula Grun.

N. complanata Grun.

Schizonema Smithii Ag.

S. crucigerum W. Sm.

S. Grevillei Ag.

S. ramosissimum Ag.

Colletonema lacustre (Ag.) V. H.

Vanheurckia rhombooides Breb.

V. rhombooides v. *Saxonica* Rab.

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| <i>V. vulgaris</i> V. H. | <i>Orthotropis lepidoptera</i> (Greg.) |
| <i>Amphibleura pellucida</i> Kütz. | Cl. |
| <i>Brebissonia Boeckii</i> Grun. | |
| <i>Berkeleya fragilis</i> Grev. | |
| <i>B. obtusa</i> Grev. | |
| <i>Scoliopleura latestriata</i> (Breb.) | |
| | Grun. |
| <i>S. tumida</i> (Breb.) Grun. | |
| <i>S. Westii</i> (W. Sm.) Grun. | |
| <i>Toxonidea insignis</i> Donk. | |
| <i>T. undulata</i> Norm. | |
| <i>Donkinia carinata</i> (Donk.) Ralfs. | |
| <i>Pleurosigma angulatum</i> W. Sm. | |
| <i>P. aestuarii</i> W. Sm. | |
| <i>P. quadratum</i> W. Sm. | |
| <i>P. delicatulum</i> W. Sm. | |
| <i>P. strigosum</i> W. Sm. | |
| <i>P. rigidum</i> W. Sm. | |
| <i>P. affine</i> v. <i>Normanni</i> . | |
| <i>P. naviculaceum</i> Breb. | |
| <i>P. intermedium</i> W. Sm. | |
| <i>P. intermedium</i> v. <i>nubecula</i> . | |
| <i>P. speciosum</i> W. Sm. | |
| <i>P. elongatum</i> W. Sm. | |
| <i>P. acutum</i> Norm. | |
| <i>P. obscurum</i> W. Sm. | |
| <i>P. decorum</i> W. Sm. | |
| <i>P. Hippocampus</i> W. Sm. | |
| <i>P. attenuatum</i> W. Sm. | |
| <i>P. attenuatum</i> v. <i>scalptum</i> . | |
| <i>P. litorale</i> W. Sm. | |
| <i>P. Balticum</i> W. Sm. | |
| <i>P. Balticum</i> v. <i>Brebissonii</i> . | |
| <i>P. Balticum</i> v. <i>Wansbeckii</i> . | |
| <i>P. acuminatum</i> (Kütz.) Grun. | |
| <i>P. strigilis</i> W. Sm. | |
| <i>P. Spencerii</i> v. <i>Smithii</i> . | |
| <i>P. Spencerii</i> v. <i>curvula</i> . | |
| <i>P. tenuissimum</i> W. Sm. | |
| <i>P. Parkeri</i> Harr. | |
| <i>P. distortum</i> W. Sm. | |
| <i>P. Fasciola</i> W. Sm. | |
| <i>P. Fasciola</i> v. <i>prolongatum</i> . | |
| <i>P. mucrum</i> (Thw.) V. H. | |
| <i>P. eximium</i> (Thw.) V. H. | |
| <i>P. scalproides</i> Rab. | |
| <i>P. lanceolatum</i> Donk. | |
| <i>Amphiprora alata</i> Kütz. | |
| <i>A. paludosa</i> W. Sm. | |
| <i>A. ornata</i> Baul. | |
| <i>A. venusta</i> Grev. | |
| | |
| | <i>Orthotropis lepidoptera</i> (Greg.) |
| | Cl. |
| | <i>O. lepidoptera</i> v. <i>Mediterranea</i> |
| | Grun. |
| | <i>Plagiotropis elegans</i> (W. Sm.) |
| | Grun. |
| | <i>P. vitrea</i> (W. Sm.) Grun. |
| | <i>P. gibberula</i> Grun. |
| | <i>Auricula complexa</i> (Greg.) Cl. |
| | Tribe <i>Gomphonemæ</i> . |
| | <i>Gomphonema constrictum</i> Eh. |
| | <i>G. constrictum</i> v. <i>capitatum</i> . |
| | <i>G. acuminatum</i> Eh. |
| | <i>G. acuminatum</i> v. <i>elongatum</i> . |
| | <i>G. acuminatum</i> v. |
| | trigonocephalum. |
| | <i>G. acuminatum</i> v. <i>Augur</i> . |
| | <i>G. subtile</i> Eh. |
| | <i>G. montanum</i> v. <i>commutatum</i> . |
| | <i>G. parvulum</i> Kütz. |
| | <i>G. gracile</i> Eh. |
| | <i>G. micropus</i> Kütz. |
| | <i>G. intricatum</i> Kütz. |
| | <i>G. intricatum</i> v. <i>vibrio</i> . |
| | <i>G. angustatum</i> Kütz. |
| | <i>G. olivaceum</i> Kütz. |
| | <i>G. exiguum</i> Kütz. |
| | <i>G. insigne</i> Greg. |
| | <i>Rhoicosphenia curvata</i> (Kütz.) |
| | Grun. |
| | <i>R. curvata</i> v. <i>marina</i> . |
| | <i>R. curvata</i> v. <i>subarcuata</i> Cl. |
| | Tribe <i>Achnanthæ</i> . |
| | <i>Achnanthidium flexellum</i> Breb. |
| | <i>Achnanthes longipes</i> Ag. |
| | <i>A. brevipes</i> Ag. |
| | <i>A. brevipes</i> v. <i>minor</i> . |
| | <i>A. subsessilis</i> Eh. |
| | <i>A. parvula</i> Kütz. |
| | <i>A. coarctata</i> Breb. |
| | <i>A. Hungarica</i> Grun. |
| | <i>A. microcephalum</i> Kütz. |
| | <i>A. ovalis</i> (Greg.) V. H. |
| | <i>A. delicatula</i> Kütz. |
| | <i>A. exilis</i> Kütz. |
| | <i>A. minutissima</i> Kütz. |
| | <i>A. linearis</i> W. Sm. |
| | <i>A. trinodis</i> (Arnott) Grun. |
| | <i>A. lanceolata</i> Breb. |
| | <i>A. lanceolata</i> v. <i>dubia</i> . |

Tribe Cocconeideæ.

- Anorthoneis excentrica* (Donk.)
Grun.
Campyloneis Grevillei (W. Sm.)
Grun.
Pleuroneis costata (Greg.) Cl.
Cocconeis scutellum Eh.
C. scutellum v. stauroneiformis.
C. scutellum v. parvæ.
C. distans (Greg.) Grun.
C. pediculus Eh.
C. placentula Eh.
C. placentula v. lineata.
C. Danica Flog.
C. dirupta Greg.
C. molesta v. amygdalina.
C. minuta Cl.
C. Helvetica Brun.

Sub-family PSEUDO-RAPHIDEÆ.

Tribe Epithemieæ.

- Epithemia turgida* (Eh.) Kütz.
E. turgida v. Westermannii Kütz.
E. turgida v. granulata.
E. Hyndmanni W. Sm.
E. Sorex Kütz.
E. gibba Kütz.
E. gibba v. ventricosa Kütz.
E. Argus Kütz.
E. Argus v. longicornis W. Sm.
E. Argus v. amphicephala.
E. Zebra (Eh.) Kütz.
E. Zebra v. proboscidea Grun.
E. Musculus Kütz.
E. Musculus v. constricta.
E. gibberula v. rupestris.
E. ocellata Kütz.
Eunotia Arcus Eh.
E. Arcus v. bidens.
E. major (W. Sm.) Rab.
E. gracilis (Eh.) Rab.
E. exigua Breb.
E. pectinalis (Kütz.) Rab.
E. pectinalis v. undulata.
E. pectinalis v. ventricosa.
E. Veneris Kütz.
E. prærupta Eh.
E. robusta Ralfs.
E. robusta v. tetraodon.
- E. diodon* Eh.
E. monodon Eh.
E. lunaris (Eh.) Grun.
E. lunaris v. bilunaris.
E. lunaris v. undulata.
E. lunaris v. subarcuata.
E. flexuosa v. bicapitata.
- Tribe Synedreæ.
- Synedra pulchella* Kütz.
S. pulchella v. Smithii Ralf.
S. pulchella v. lanceolata.
S. Vaucheriæ Kütz.
S. Vaucheriæ v. deformis.
S. ulna (Nitz.) Eh.
S. ulna v. Danica F.
S. ulna v. longissima.
S. ulna v. splendens.
S. ulna v. obtusa.
S. ulna v. oxyrhyncus.
S. ulna v. vitrea.
S. ulna v. aequalis.
S. ulna v. amphirhyncus.
S. acus (Kütz.) Grun.
S. acus v. delicatissima.
S. radians (Kütz.) Grun.
S. Gallionii Eh.
S. investiens W. Sm.
S. barbatula Kütz.
S. capitata Eh.
S. amphicephala Kütz.
S. affinis Kütz.
S. affinis v. gracilis.
S. affinis v. tabulata.
S. affinis v. hamata.
S. affinis v. fasciculata.
S. affinis v. Arcus.
S. affinis v. Arcus.
S. fulgens (Kütz.) W. Sm.
S. baculus Kütz.
Asterionella formosa Hass.
A. formosa v. Bleakleyi.
A. formosa v. Ralfsii.
A. formosa v. gracillima.
Thalassionella Nitzschoides Gr.
- Tribe Fragilarieæ.
- Fragilaria virescens* Ralfs.
F. undata W. Sm.
F. striatula Lyngb.

- F. hyalina* (Kütz.) Grun.
F. capucina Desm.
F. capucina v. *mesolepta*.
F. construens (Eh.) Grun.
F. construens v. *venter*.
F. construens v. *binodis*.
F. tenuicollis v. *intermedia*.
F. Harrisonii (W. Sm.) Grun.
F. mutabilis (W. Sm.) Grun.
F. brevistriata Grun.
Campylosira cymbelliformis
 (A. S.) Grun.

Tribe *Raphoneideæ*.

- Raphoneis amphiceros* Eh.
R. amphiceros v. *rhombica*
 Grun.
R. amphiceros v. *Belgica* Grun.
Plagiogramma Gregorianum
 Grev.
 Tribe *Licmophoreæ*.
Licmophora Dalmatica (Kütz.)
 Grun.
L. gracilis v. *minor*.
L. Anglicula (Kütz.) Grun.
L. paradoxa (Lyng.) Ag.
L. communis (Heib.) Grun.

Tribe *Meridioneæ*.

- Meridion circulare* Ag.
M. circulare v. *constrictum*.
M. circulare Zinkenii Kütz.

Tribe *Diatomeæ*.

- Diatoma vulgare* Bory.
D. elongatum Ag.
D. elongatum v. *Ehrenbergii*.
D. tenue Ag.
D. hiemale (Lyng.) Heib.
D. hiemale v. *mesodon*.
Denticula elegans Kütz.
D. tenuis Kütz.
D. tenuis v. *inflata*.
D. tenuis v. *frigida*.

Tribe *Tabellaricæ*.

- Grammatophora marina*
 (Lyng.) Kütz.
G. marina v. *maculata*.

- G. serpentina* (Ralfs.) Eh.
G. serpentina v. *nodulosa* Grun.
Tabellaria fenestrata (Lyng.)
 Kütz.
T. flocculosa (Roth.) Kütz.
Tetracyclus rupestris
 (Braun.) Grun.
Rhabdonema Adriaticum Kütz.
R. arcuatum (Ag.) Kütz.
R. minutum Kütz.

Tribe *Surirellineæ*.

- Cymatopleura elliptica* (Breb.)
 W. Sm.
C. elliptica v. *Hibernica*.
C. elliptica v. *constricta*.
C. solea (Breb.) W. Sm.
C. Solea v. *apiculata*.
C. Solea v. *regula*.
Surriella biseriata Breb.
S. linearis W. Sm.
S. constricta Eh.
S. elegans Eh.
S. subsalsa W. Sm.
S. robusta Eh.
S. robusta v. *splendida*.
S. robusta v. *tenera*.
S. striatula Turp.
S. striatula f. *biplicata*.
S. modulica Per.
S. gemma Eh.
S. fastuosa Eh.
S. comis A.S.
S. turgida W. Sm.
S. ovalis Breb.
S. ovalis v. *crumena*.
S. ovalis v. *Brightwellii*.
S. ovalis v. *ovala*.
S. ovalis v. *minuta*.
S. ovalis v. *salina*.
S. ovalis v. *angusta*.
S. ovalis v. *apiculata*.
S. ovalis v. *panduriformis*.
S. ovalis v. *pinnata*.
S. fluminensis Grun.
S. spiralis Kütz.
Campylodiscus Hodgsonii
 W. Sm.
C. decorus Breb.
C. parvulus W. Sm.

<i>C. Echineis</i> Eh.	<i>N. Brebissonii</i> W. Sm.	
<i>C. Echineis v. cribrosus.</i>	<i>N. Sigma</i> W. Sm.	
<i>C. clypeus</i> Eh.	<i>N. Sigma v. intercedens</i> Grun.	
<i>C. Thuretii</i> Breb.	<i>N. Sigma v. rigida.</i>	
<i>C. Hibernicus</i> Eh.	<i>N. Sigma v. rigidula.</i>	
Tribe <i>Nitzschieæ</i> .		
<i>Hantzschia amphioxys</i> (Eh.)	<i>N. Sigma v. Sigmatella.</i>	
	<i>N. fasciculata</i> Grun.	
<i>H. amphioxys v. intermedia</i>	<i>N. obtusa v. scalpelliformis.</i>	
	<i>N. obtusa v. brevissima.</i>	
<i>H. vivax</i> (Htz.) Per.	<i>N. obtusa v. nana.</i>	
<i>H. hyalina</i> Grun.	<i>N. spectabilis</i> (Eh.) Ralfs.	
<i>H. virgata</i> (Rop.) Grun.	<i>N. linearis</i> (Ag.) W. Sm.	
<i>H. marina</i> (Donk.) Grun.	<i>N. linearis v. tenuis.</i>	
<i>Nitzschia navicularis</i> (Breb.)	<i>N. vitrea</i> Norm.	
	<i>N. lanceolata</i> W. Sm.	
<i>N. punctata</i> (W. Sm.) Grun.	<i>N. lanceolata f. minor.</i>	
<i>N. punctata v. coarctata.</i>	<i>N. subtilis</i> Grun.	
<i>N. punctata v. elongata.</i>	<i>N. Palea</i> (Kütz.) W. Sm.	
<i>N. Tryblionella</i> Hantz.	<i>N. Palea v. tenuirostris.</i>	
<i>N. Tryblionella v. maxima.</i>	<i>N. communis</i> Rab.	
<i>N. Tryblionella v. Levidensis.</i>	<i>N. amphibia</i> Grun.	
<i>N. Tryblionella v. calida.</i>	<i>N. longissima</i> (Breb.) Ralfs.	
<i>N. Tryblionella v. littoralis.</i>	<i>N. longissima v. reversa.</i>	
<i>N. debilis</i> (Arn.) Grun.	<i>N. longissima v. parva.</i>	
<i>N. angustata</i> (W. Sm.) Grun.	<i>N. acicularis</i> W. Sm.	
<i>N. constricta</i> (Greg.) Grun.	<i>N. Lorenziana v. incurva</i> Grun.	
<i>N. plana</i> W. Sm.	<i>N. incurva v. densistriata</i> Per.	
<i>N. Hungarica</i> Grun.	<i>N. epithemooides</i> Grun.	
<i>N. apiculata</i> (Greg.) Grun.	<i>N. filiformis</i> W. Sm.	
<i>N. acuminata</i> (W. Sm.) Grun.	<i>N. subcohaerens</i> Grun.	
<i>N. circumsuta</i> (Bail.) Grun.	<i>Cylindrotheca gracilis</i> (Breb.)	
<i>N. dubia</i> W. Sm.	Grun.	
<i>N. thermalis</i> (Kütz.) Grun.	Sub-family CRYPTORAPHIDEÆ.	
<i>N. commutata</i> Grun.	Tribe <i>Chaetocereæ</i> .	
<i>N. bilobata</i> W. Sm.	<i>Rhizosolenia robusta</i> Norm.	
<i>N. Denticula</i> Grun.	<i>R. setigera</i> Bright.	
<i>N. sinuata</i> (W. Sm.) Grun.	<i>R. calcar-avis</i> Sch.	
<i>N. scalaris</i> W. Sm.	<i>R. styliformis</i> Bright.	
<i>N. insignis</i> Greg.	<i>R. imbricata</i> Bright.	
<i>N. socialis</i> Greg.	<i>R. alata</i> Bright.	
<i>N. paradoxa</i> (Gmel.) Grun.	<i>Chaetoceros armatus</i> West.	
<i>N. vivax</i> W. Sm.	<i>C. Wighamii</i> Bright.	
<i>N. angularis</i> W. Sm.	<i>C. Lorenzianus</i> Grun.	
<i>N. spathulata</i> Breb.	<i>C. borealis</i> Bright.	
<i>N. cursoria</i> (Donk.) Grun.	<i>C. Peruvianus</i> Bright.	
<i>N. dissipata</i> (Kütz.) Grun.	<i>C. Danicus</i> Cl.	
<i>N. dissipata v. media.</i>	<i>C. diadema</i> (Eh.) Cl.	
<i>N. sigmoidea</i> (Eh.) W. Sm.	<i>C. didymus</i> (Eh.) Cl.	
<i>N. vermicularis</i> (Kütz.) Grun.	<i>C. teres</i> Cl.	

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| <i>C. decipiens</i> Cl. | <i>B. turgida</i> W. Sm. | |
| <i>C. currens</i> Cl. | <i>B. lœvis</i> Eh. | |
| <i>Bacteriastrum varians</i> Laud. | <i>B. (Cerataulus) Smithii</i> Ralfs. | |
| <i>Ditylum Brightwellii</i> West. | <i>B. (Amphitetras)</i> | |
| | <i>antediluviana</i> Eh. | |
| Tribe <i>Melosireæ</i> . | | |
| <i>Stephanopyxis Turris</i> (Grev.) | <i>Triceratum favus</i> Eh. | |
| | <i>T. alternans</i> Bail. | |
| | <i>T. armatum</i> Roper. | |
| | <i>T. variabile</i> Bright. | |
| Tribe <i>Eupodisceæ</i> . | | |
| <i>Thalassiosira Nordenskioldii</i> Cl. | <i>Auliscus sculptus</i> W. Sm. | |
| <i>Skeletonema costatum</i> (Grev.) | <i>Eupodiscus argus</i> Eh. | |
| | <i>Aulacodiscus Sollittianus</i> | |
| | Arnott. | |
| <i>Melosira nummuloides</i> (Bory.) | <i>Roperia tesselata</i> (Roper.) | |
| | Grun. | |
| <i>M. Westii</i> W. Sm. | Tribe <i>Heliopeltæ</i> . | |
| <i>M. Borreri</i> Grev. | <i>Actinoptychus undulatus</i> Eh. | |
| <i>M. varians</i> Ag. | <i>A. splendens</i> (Shad.) Ralfs. | |
| <i>M. Jurgensii</i> Ag. | Tribe <i>Coscinodisceæ</i> . | |
| <i>M. Roesiana</i> Rab. | <i>Stephanodiscus Hantzschianus</i> | |
| <i>M. distans</i> v. <i>nivalis</i> . | Grun. | |
| <i>M. crenulata</i> Kütz. | <i>Actinocyclus Ralfsii</i> W. Sm. | |
| <i>M. arenaria</i> Moore. | <i>A. crassus</i> (W. Sm.) Ralfs. | |
| <i>M. granulata</i> (Eh.) Ralfs. | <i>A. subtilis</i> (Greg.) Ralfs. | |
| <i>M. sulcata</i> (Eh.) Kütz. | <i>A. Roperii</i> (Breb.) Kitt. | |
| <i>Cyclotella striata</i> (Kütz.) Grun. | <i>A. Ehrenbergii</i> Ralfs. | |
| <i>C. antiqua</i> W. Sm. | <i>Coscinodiscus perforatus</i> Eh. | |
| <i>C. comta</i> v. <i>radiosa</i> . | <i>C. radiatus</i> Eh. | |
| <i>C. operculata</i> Kütz. | <i>C. oculus iridis</i> Eh. | |
| <i>C. Meneghiniana</i> Kütz. | <i>C. centralis</i> Eh. | |
| <i>C. Kutzngiana</i> Chauv. | <i>C. concinnus</i> W. Sm. | |
| <i>Podosira Smithiana</i> Grun. | <i>C. excentricus</i> Eh. | |
| <i>Druridgea geminata</i> Donk. | <i>C. decipiens</i> Grun. | |
| <i>Hyalodiscus stelliger</i> Bail. | <i>C. subtilis</i> (Eh.) Grun. | |
| <i>H. Scoticus</i> (Kütz.) Grun. | <i>C. subtilis</i> v. <i>Normanii</i> Greg. | |
| Tribe <i>Biddulphicæ</i> . | | |
| <i>Eucampia Zodiacus</i> Eh. | <i>C. lacustris</i> Grun. | |
| <i>Biddulphia aurita</i> (Lyng.) | <i>C. labyrinthus</i> Roper. | |
| | <i>C. obscurus</i> A. S. | |
| <i>B. Rhombus</i> (Eh.) W. Sm. | <i>C. symmetricus</i> Grev. | |
| <i>B. Rhombus</i> v. <i>trigona</i> . | | |
| <i>B. Baileyii</i> W. Sm. | | |
| <i>B. granulata</i> Roper. | | |

FUNGI OF EAST YORKSHIRE

By A. E. PECK, Scarborough,

*Hon. Sec. Mycological Committee of the Yorkshire
Naturalists' Union.*

YORKSHIRE has had a devoted band of Mycologists for many years past. These centre on the Mycological Committee of the Yorkshire Naturalists' Union, the organized Annual Fungus Forays of which have been held since 1881.

The "County of broad acres" contains many extensive estates embracing fine old woodlands, the happiest of hunting-grounds for the Mycologist. Permission to visit these is never sought in vain.

Perhaps Mulgrave Woods (near Whitby), Castle Howard and Helmsley (both the latter within twenty miles of York) are held in rather special affection by the Yorkshire devotees, while the district round Scarborough, where the late George Massee lived and worked at Mycology for many years, may also be reckoned first-class ground.

This year's Foray is to be held at Buckden, near Grassington, from September 30th to October 5th. Members of the British Association interested in the Fungi are informed that their presence and participation will be appreciated.

Reports of all past Forays, with Records, may be read in *The Naturalist*, the organ of the Yorkshire Naturalists' Union, while a summary of Records to the year 1905 may be inspected in "The Fungus

Flora of Yorkshire," by George Massee and Chas. Crossland, containing a list of 2626 species. Eight supplementary lists have since been published in *The Naturalist*, bringing up the total to about 3000 species for the county.

A reference to these works would impart a fair idea as to the position of the study in Yorkshire, as well as revealing in full what our county has produced.

To anyone able to attend the Foray named, the writer ventures to recommend, if time permits, perusal of the above-named works as being conducive to the fuller enjoyment and appreciation of the gathering.

An account of the last Meeting held at Buckden (1916) is given in *The Naturalist* for March, 1917 (No. 722). This Foray was notable as the last participated in by George Massee.

Perhaps it ought to be recorded that it was at the Yorkshire Foray of 1896 that the British Mycological Society came into being.

The present Chairman of our Committee, Harold Wager, D.Sc., F.R.S. (a past President of the Yorkshire Naturalists' Union and of the British Mycological Society), and Mr. W. N. Cheesman, J.P. (also a past President of the Yorkshire Naturalists' Union, and an enthusiastic worker in the Mycetozoa) will, no doubt, be present at the Hull Meeting of the British Association, and pleased to give any further information desired.

THE LARGER FUNGI.

To begin with the Agarics and the genus *Amanita*, *A. virosa* is rare; *A. phalloides* and *A. mappa*, two (¹) dangerously poisonous species, common and at times in abundance. *A. muscaria*, the Fly Agaric,

beautiful as it is poisonous, always in association with Birch trees, well distributed. *A. rubescens*, "the Blusher," most common of all Amanitas, is a good edible, much appreciated by those who know it. *A. strobiliformis* is rare.

Amanitopsis vaginata and *A. fulva* are common. *Lepiota procera* and *L. rachodes* are well distributed and esteemed for the table. The latter species grew heavy crops in Pine woods near Scarborough before the war brought about extensive felling. Many other species of interest thus totally disappeared. *Lepiota gracilenta* is rather rare. Many of the smaller *Lepiotas* are recorded, the most common being *L. cristata*, *L. carcharia*, *L. granulosa* and *L. amianthina*.

Armillaria mellea is ubiquitous. *A. mucida* flourishes on old Beech trees at Castle Howard, Helmsley and a few other similar old woodlands.

The genus *Tricholoma* has many species represented with *T. personatum*, well known, even to townsmen, as an edible. *T. gambosum* is frequent in pastures in springtime, only known, as an edible, in the writer's experience, to Mycologists.

The other white-spored genera are all well represented. In the pink spores we find the genus *Volvaria* to be somewhat rare. *Pluteus cervinus* is common. Castle Howard has a record of the variety *rigens*. We have a speciality in *Entoloma Farrahi* (Massee and Crossland), the species being founded at Helmsley in 1903. It differs from its nearest allies, *E. Bloxami* and *E. ardosiacum* in having elliptical smooth spores and in other points. In some parts *E. jubatum* is eaten. Other pink-spored genera well distributed.

Brown spores: *Pholiota præcox* greets us in the springtime; *P. squarrosa* is the most common species;

P. spectabilis is not rare; *P. adiposa* is recorded for Mulgrave and Helmsley, and many other species are on our list.

The genera *Inocybe*, *Hebeloma*, *Flammula*, etc., have many species recorded, while the student of the genus *Cortinarius* can find much scope for energy. No easy group this; *C. (Myxa) elatior* is the most common.

In *Psalliota*, which includes our "mushrooms," *P. augusta* was abundant in Pine woods near Scarborough, now felled, growing up to 14 ins. diameter, and providing a fine spectacle; now somewhat rare. *P. haemorroidarius* and *P. pratensis* were also abundant, but are now rather rare from the same reason. *P. silvaticus*, *P. silvicola* and *P. Elvensis* are also subject to the same comment. The other dark-spored Agarics are with us in about the usual degree. *Coprinus comatus* grows in huge numbers round Scarborough Mere on "made ground," and in many other localities under similar conditions. This species is eaten in some districts, as is also *C. atramentarius*. *C. picaceus* was met with in Hackness Park by the writer. *Gomphidius viscidus* grows in abundance in many of the woods round Scarborough, as well as in the "Waterless dales" of the Yorkshire Wolds.

Paxillus involutus is common everywhere. Scarborough specimens of *P. paradoxus* formed the first British record. The genus *Hygrophorus* has many representatives in both pasture and woodland, chiefly the former. On the other hand, finely coloured species of *Lactarius* and *Russula* give their displays in woodlands only. *Cantharellus cibarius* and *C. aurantiacus* have numerous records, but other species are rare.

Nyctalis asterophora and *N. parasitica* are both

with us. The genera *Marasmius*, *Lentinus*, *Panus* and *Lenzites* are all represented in our flora.

Turning to the Polypores, many districts are rich in *Boleti*, and records are heavy. *B. satanus* and *B. parasitica* are recorded for Scarborough, but the writer has not seen them. *B. luridus* is common here, however. *B. laricinus* occurs in Pine woods near Scarborough, and reminds one of *Strobilomyces strobilaceus*, which has been recorded upon a number of occasions for the county, but never in the Scarborough district. The "Beefsteak" fungus, *Fistulina hepatica*, is widely distributed on old Oaks, but last year at Castle Howard it was observed on Walnut. *Polyporus squamosus* and *P. betulinus* are the most numerous of this genus, but many other species occur, and the county is rather rich in this particular.

Fomes laccatus, a perennial polypore of polished beauty, occurs near Scarborough, and furnished the first authentic British record. The writer still meets with odd specimens in one locality only—on Alder stumps. *Fomes fomentarius* is found in many places, but nowhere in such beauty and symmetry as on the Beech trees of Helmsley. The finest specimens of *Daedalea quercina* are probably to be found at Castle Howard. *Merulius lacrymans*, the "Dry-rot" fungus, is only too well known. It has been found in a wild state on several occasions at Mulgrave, etc.

The Hydnums and allied forms are well distributed. *Craterellus cornucopioides*, the "Horn of Plenty," is turned up at most Forays, and there are numerous records of other of the *Thelephoraceæ* as well as of the *Clavariaceæ*. The Jew's Ear, *Hirneola auricula-judæ* is common on Elder, but is also recorded upon Elm, Willow, Sycamore, etc. The Yorkshire mycolo-

gist Bolton recorded *Cordyceps capitata* so long ago as 1788, and it was also found in 1915 by Dr. Wager and the writer, but its host was not discovered. *Daldinia concentrica* is recorded for Pocklington and Hull, but there are other county records. In Yorks., N.E., however, it is rare, but it occurs rather frequently at the foot of the Wolds nearest Scarborough.

With regard to subterranean fungi, *Elaphomyces granulatus* has a number of habitats. It is found in heathy soil in woods chiefly of Beech. The writer has found it in one spot at Raincliffe Woods, Scarborough, its presence being betrayed by its aerial parasite, *Cordyceps ophioglossoides*. *Choeromyces meandriformis*, with its strong odour, has been found at Mulgrave. Of the larger Discomycetes, the Morel, *Morchella esculenta*, has a general distribution. I only know it from Forge Valley and Nedmandale, in the Scarborough district, but it is said to grow in cartloads in a Vale near Kirbymoorside. The other Morels are rare. *Mitrophora gigas* (= *M. semilibera*) has a number of records, and was numerous in Forge Valley in 1920. *Gyromitra esculenta* has appeared at Salterhebble, near Halifax, each year since 1807.

Helvella crispa is well distributed, and many other species of *Helvella* are recorded. *Verpa digitaliformis* was met with in Forge Valley by Massee, but the writer has searched for it there without success.

The various species of *Geoglossum*, *Spathularia*, *Vibrissa*, *Mitrula*, *Lcotia*, *Rhizina*, *Acetabula*, *Peziza* and smaller Discos are included in the Yorkshire Flora, and amongst other rarities in this group recorded by the writer in the Scarborough district are *Spathularia clavata*, *Mitrula viridis* and *Acetabula vulgaris*, one habitat each.

Of Puffballs we have our share. One specimen of *Lycoperdon bovista* recorded weighed $10\frac{1}{2}$ lbs. One regrets that rustics delight in kicking these to pieces, little knowing how good they are when sliced and fried. The Stinkhorn, *Phallus impudicus*, is met with everywhere. At our 1915 Foray the writer exhibited specimens gathered in Beedale (not Bedale) which bore a distinct veil, a character of the tropical phalloids (for illustration and notice, see *The Naturalist*, January, 1916, No. 708).

*MARINE ALGÆ OF EAST YORKSHIRE

THE localities that have been best worked for Marine Algæ are in the neighbourhood of Scarborough. The following is a list of species, and the sequence and nomenclature followed is that given in Batter's Catalogue of British Marine Algæ (*Journ. Bot. Suppl.*, 1902).

MYXOPHYSE.E.

- Dermocarpa prasina* Born.
Lyngbya aestuarii Liebm.
Calothrix confervicola Ag.
Rivularia atra Roth.

CHLOROPHYCE.E.

- Prasiola stipitata* Suhr.
Percursaria percursa Rosenv.
Enteromorpha intestinalis Link.
E. compressa Grev.
E. paradoxa Kütz.
E. clathrata J. Ag.
E. Linza J. Ag.
Ulva Lactuca L.
 var. *latissima* DC.
Urospora isogona Batt.
Chætomorpha litorea Cook.
C. melagonium Kütz.
C. erica Kütz.
Rhizoclonium implexum Batt.
 non Kütz.
R. riparium Harv.
Cladophora rupestris Kütz.
C. glaucescens Harv.
C. flexuosa Harv.

C. albida Kütz.

C. arcta Kütz.

C. uncialis Kütz.

C. lanosa Kütz.

C. refracta Aresch.

C. utriculosa Kütz.

Bryopsis plumosa Ag.

Vaucheria velutina Harv. (?).

Codium tomentosum Stakh.

FUCOIDE.E.

- Desmarestia aculeata* Lam.
D. viridis Lam.
Dictyosiphon foeniculaceus Grev.
Litosiphon pusillum Harv.
L. Laminariae Harv.
Phlæospora brachiata Born.
Punctaria latifolia Grev.
P. plantaginea Grev.
Scytosiphon lomentarius J. Ag.
Asperococcus bulbosus Lam.
A. fistulosus Hook.
Ectocarpus velutinus Kütz.
E. siliculosus Kütz.
E. tomentosus Lyngb.
E. granulosus Ag.
E. fasciculatus Harv.

*The Victoria History of the County of York. Ed., WM. PAGE.
Vol. I., 1907. Revised by A. D. COTTON.

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| <i>Pylaiella litoralis</i> Kjellm. | <i>Phyllophora epiphylla</i> Batt. |
| <i>P. litoralis</i> Kjellm. | <i>P. membranifolia</i> J. Ag. |
| var. <i>longifructus</i> Batt. | <i>Ahnfeltia plicata</i> Fr. |
| <i>Isthmoplea sphærophora</i> Kjellm. | <i>Callophyllis laciniata</i> Kütz. |
| <i>Myriotrichia clavæformis</i> Harv. | <i>Cystoclonium purpurascens</i> Kütz |
| <i>M. filiformis</i> Harv. | <i>Catenella repens</i> Batt. |
| <i>Myriactis stellulata</i> Batt. | <i>Rhodophyllia bifida</i> Kütz. |
| <i>Sphaelaria cirrhosa</i> Ag. | <i>Gracilaria confervoides</i> Grev. |
| <i>S. radicans</i> Harv. | <i>Calliblepharis ciliata</i> Kütz. |
| <i>Cladostephus verticillatus</i> Ag. | <i>Rhodymenia palmata</i> Grev. |
| <i>C. spongiosus</i> Ag. | <i>Lomentaria articulata</i> J. Ah. |
| <i>Stylocaulon scoparium</i> Kütz. | <i>L. clavellosa</i> Gaill. |
| <i>Myrionema strangulans</i> Grev. | <i>L. rosea</i> Thur. |
| var. <i>punctiforme</i> Holm./Batt. | <i>Chylocladia kaliformis</i> Hook. |
| <i>Ulonema rhizophorum</i> Fosl. | <i>Plocamium coccineum</i> Lyngb. |
| <i>Ascocyclus fæcundus</i> Cotton. | <i>Nitophyllum ramosum</i> Batt. |
| <i>A. orbicularis</i> Magn. | <i>N. punctatum</i> Grev. |
| <i>Ralfsia verrucosa</i> Aresch. | <i>N. Bonnemaisoni</i> Grev. |
| <i>Chordaria flagelliformis</i> Ag. | <i>Delesseria sanguinea</i> Lamour. |
| <i>Mesogloia vermiculata</i> Le Jol. | <i>D. ruscifolia</i> Lamour. |
| <i>Castagnea virescens</i> Thur. | <i>D. sinuosa</i> Lamour. |
| <i>Leathesia difformis</i> Aresch. | <i>D. alata</i> Lamour. |
| <i>Sporochnus pedunculatus</i> Ag. | <i>D. angustissima</i> Griff. |
| <i>Laminaria digitata</i> Lamour. | <i>D. hypoglossum</i> Lamour. |
| <i>L. Cloustoni</i> Edm. | <i>Rhodomela lycopodooides</i> Ag. |
| <i>L. saccharina</i> Lamour. | <i>R. subfusca</i> Ag. |
| <i>Saccorhiza polyschides</i> Batt. | <i>Odonthalia dentata</i> Lyngb. |
| <i>Alaria esculenta</i> Grev. | <i>Laurencia pinnatifida</i> Lamour. |
| <i>Fucus vesiculosus</i> L. | <i>L. hybrida</i> Lenorm. |
| <i>F. spiralis</i> L. | <i>L. obtusa</i> Lamour. |
| <i>F. ceranoides</i> L. | <i>Polysiphonia urceolata</i> Grev. |
| <i>F. serratus</i> L. | <i>P. elongata</i> Grev. |
| <i>Ascophyllum nodosum</i> Le Jol. | <i>P. fibrillosa</i> Grev. |
| <i>Pelvetia canaliculata</i> Decne. | <i>P. Brodiæi</i> Grev. |
| et Thur. | <i>P. nigrescens</i> Grev. |
| <i>Himanthalia lorea</i> Lyngb. | <i>P. macrocarpa</i> Harv. |
| <i>Halidrys siliquosa</i> Lyngb. | <i>P. fibrata</i> Harv. |
| <i>Dictyota dichotoma</i> Lamx. | <i>P. subulata</i> J. Ag. |
| <i>Achinetospora pusilla</i> Born. | <i>P. elongella</i> Harv. |
| FLORIDE.E. | |
| <i>Bangia fuscopurpurea</i> Lyngb. | <i>P. nigra</i> Batt. |
| <i>Porphyra umbilicalis</i> Kütz. | <i>P. fastigiata</i> Grev. |
| <i>P. umbilicalis</i> Kütz. | <i>Pterosiphonia parasitica</i> Schm. |
| var. <i>laciniata</i> J. Ag. | <i>Brongniartella byssoides</i> Bory. |
| <i>P. umbilicalis</i> Kütz. | <i>Heterosiphonia plumosa</i> Batt. |
| var. <i>linearis</i> Thur. | <i>Spermothamnion Turneri</i> Aresch. |
| <i>Chantransia virgatula</i> Thur. | <i>Griffithsia fusculosa</i> Batt. |
| <i>Gelidium corneum</i> Lamour. | <i>Rhodochorton Rothii</i> Nag. |
| <i>Chondrus crispus</i> Stackh. | <i>R. Rothii</i> Naeg. |
| <i>Gigartina stellata</i> Batt. | <i>Callithamnion arbuscula</i> Lyngb. |
| | <i>C. tetragonum</i> Ag. |
| | <i>C. Hookeri</i> Ag. |

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| <i>C. roseum</i> Harv. | <i>C. ciliatum</i> Ducluz. |
| <i>C. polyspermum</i> Ag. | <i>Gloiosiphonia capillaris</i> Carm. |
| <i>Plumaria elegans</i> Schm. | <i>Dumontia incrassata</i> Lam. |
| <i>Ptilota plumosa</i> Ag. | <i>Dilsea edulis</i> Stackh. |
| <i>Ceramium diaphanum</i> Roth. | <i>Furcellaria fastigiata</i> Lamour. |
| <i>C. strictum</i> Harv. | <i>Polyides rotundus</i> Grev. |
| <i>C. tenuissimum</i> J. Ag. | <i>Petrocelis cruenta</i> J. Ag. |
| <i>C. flabelligerum</i> J. Ag. | <i>Hildebrandtia prototypus</i> Nardo. |
| <i>C. rubrum</i> Ag. | <i>Phymatolithon polymorphum</i>
Fosl. |
| <i>C. botryocarpum</i> Griff. | |
| <i>C. Deslongchampsii</i> Chauv. | <i>Corallina officinalis</i> L. |
| <i>C. acanthonotum</i> Carm. | <i>C. rubens</i> Ellis et Soland. |

THE RAINFALL OF THE EAST RIDING OF YORKSHIRE

By HUGH ROBERT MILL, D.Sc., LL.D.

THE map of the distribution of rainfall over the East Riding of Yorkshire shows the average annual rainfall for the period of thirty-five years from 1868. There is reason to believe that this corresponds within about 2 per cent. to the average of a very much longer period. The observations upon which it is founded were made almost entirely by private observers who sent them for discussion and publication to the Editor of "British Rainfall," and they were thus collected for the most part by the late Mr. G. J. Symons.

It is obvious that long records of rainfall cannot be found at all the points where they could be desired for the purpose of drawing a detailed map, and that it is necessary in some cases to make use of shorter records.

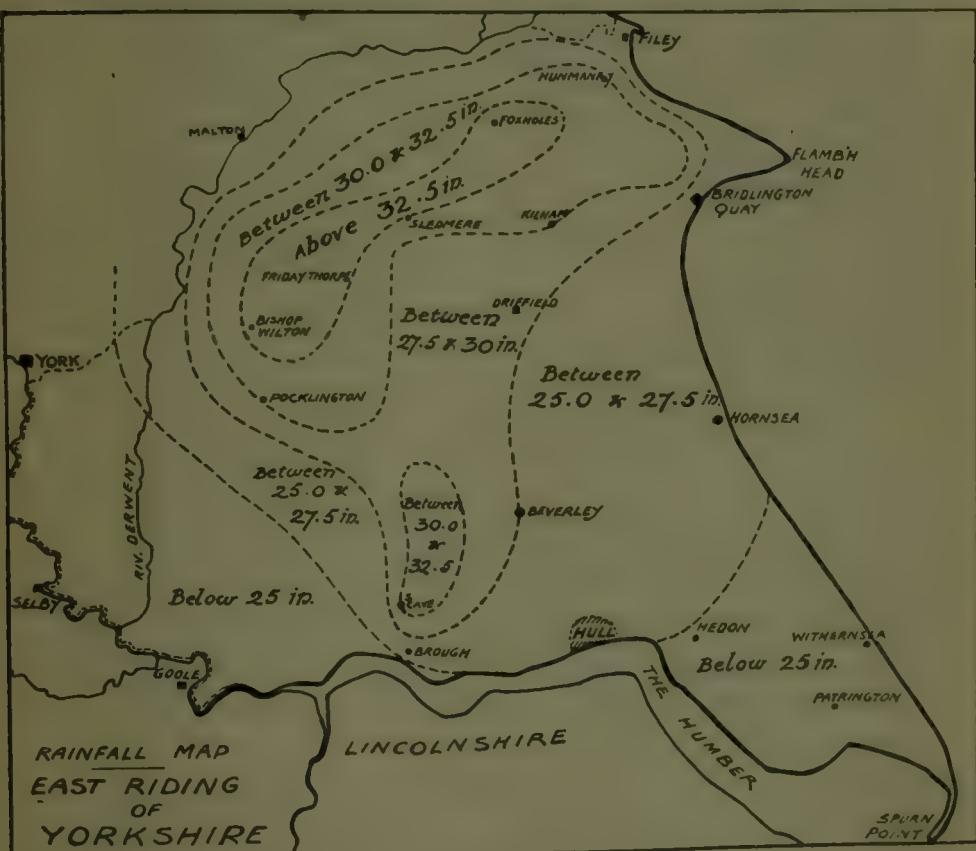
The mean rainfall of a short series of years must, however, be corrected by taking account of the character of the period to which it refers. The period in question may have been one of excessive or of deficient rainfall, and the degree of excess or deficiency can be arrived at from a study of the nearest long records. To do this the average at each station for which thirty-five years' observations are available is taken as 100, and the rainfall for each year of the thirty-five is calculated to the same ratio. The relative wetness or dryness of each year can thus be readily and exactly compared,

although one station may have a heavier rainfall than another. Nine stations in or on the borders of the East Riding had practically complete records extending over thirty-five years, and these after being expressed as percentages of the averages, were grouped so as to give figures representative of the three areas of the Riding.

A record of the fluctuations of rainfall during the 54 years, 1868-1921, shows that the wettest year was unquestionably 1872, when the rainfall was 150 per cent. of the average, or half as much again, while the driest years were 1887 and 1921, when the rainfall was only 67 and 68 per cent. respectively, or scarcely more than two-thirds of the average. The driest year had considerably less than half the rainfall of the wettest. From 1875 to 1883 there were nine years the rainfall of every one of which was above the average, the excess amounting on the whole to 16 per cent. per annum. With 1884 a period of lower rainfall set in, the average being only surpassed on six occasions in the succeeding 25 years and the deficiency amounting, on the whole, to 9 per cent. per annum. The years 1872 and 1887 were respectively the wettest and driest in the nineteenth century for England as a whole, but 1921 proved far drier than 1887 when the whole of England is considered. The year 1903, which was extremely wet in many parts of the country, had an excess of only 15 per cent. in the East Riding, six other years out of the 54 considered having been as wet or wetter.

There were altogether 65 stations in the East Riding or on its borders for which rainfall figures could be used in preparing the map, and though these were not quite uniformly distributed they suffice to give a

fair representation of the distribution of rainfall. The only part as to which any uncertainty was felt is the Vale of Pickering in the extreme north, where a few additional observers would have been an advantage.



SKETCH OF THE RAINFALL MAP OF THE EAST RIDING
OF YORKSHIRE.

It was found possible to draw lines on the map delineating those areas with less than 25 inches and those with more than 27.5, 30, and 32.5 inches respectively. The lines of equal rainfall or isohyets as reproduced give as accurate a representation of the rainfall of the Riding as the existing records can yield.

The following table shows the area occupied by each zone of $2\frac{1}{2}$ inches of rainfall and the general rainfall of the zone :—

Zone.	Square miles.	Per cent. of total area.	General rainfall of Zone.
Below 25.0 inches	305	25.7	24.5
25.0 to 27.5 „	395	33.3	26.2
27.5 to 30.0 „	228	19.3	28.5
30.0 to 32.5 „	183	15.5	31.1
Above 32.5 „	73	6.2	33.5
Total	1,184	100.0	

From these values the average general rainfall of the Riding, that is the average depth of the average annual rainfall over the whole area, is found to be 27.4 inches, and applying the mean ratios for various years from Table I. we get—

1858-1902.	Average General Rainfall of East Riding	27.4 ins.
1872.	Maximum „ „ „	41.1 „
1887, 1921.	Minimum „ „ „	18.5 „
1904-1906.	Driest 3 years General Rainfall of East Riding	22.7 „

Viewing the East Riding as a whole, we may divide it as far as the distribution of the rainfall is concerned into Upland and Plain. The Upland is formed by the Wolds, and runs in a crescent convex to the north-west from near the Humber at South Cave to Flamborough Head. Almost the whole of this area has an average rainfall exceeding 30 inches, and the higher portion,

from the neighbourhood of Pocklington to the neighbourhood of Hunmanby, has a rainfall exceeding 32.5 inches. It is extremely improbable that any part of the East Riding has an average annual rainfall so great as 35 inches. The Plain entirely surrounds the Upland, and has a rainfall almost everywhere less than 27.5 inches, and both in the Vale of York and the South-eastern Peninsula the rainfall is less than 25 inches. It is doubtful if any part of the Vale of York, or of the eastern coastal plain, has less than 24 inches of rainfall in an average year ; but the low sandy spit of Spurn Head is probably a little drier. Statistics are lacking for the peninsula terminating in Flamborough Head, and it may be that the rainfall of Flamborough is somewhat higher than the map shows.

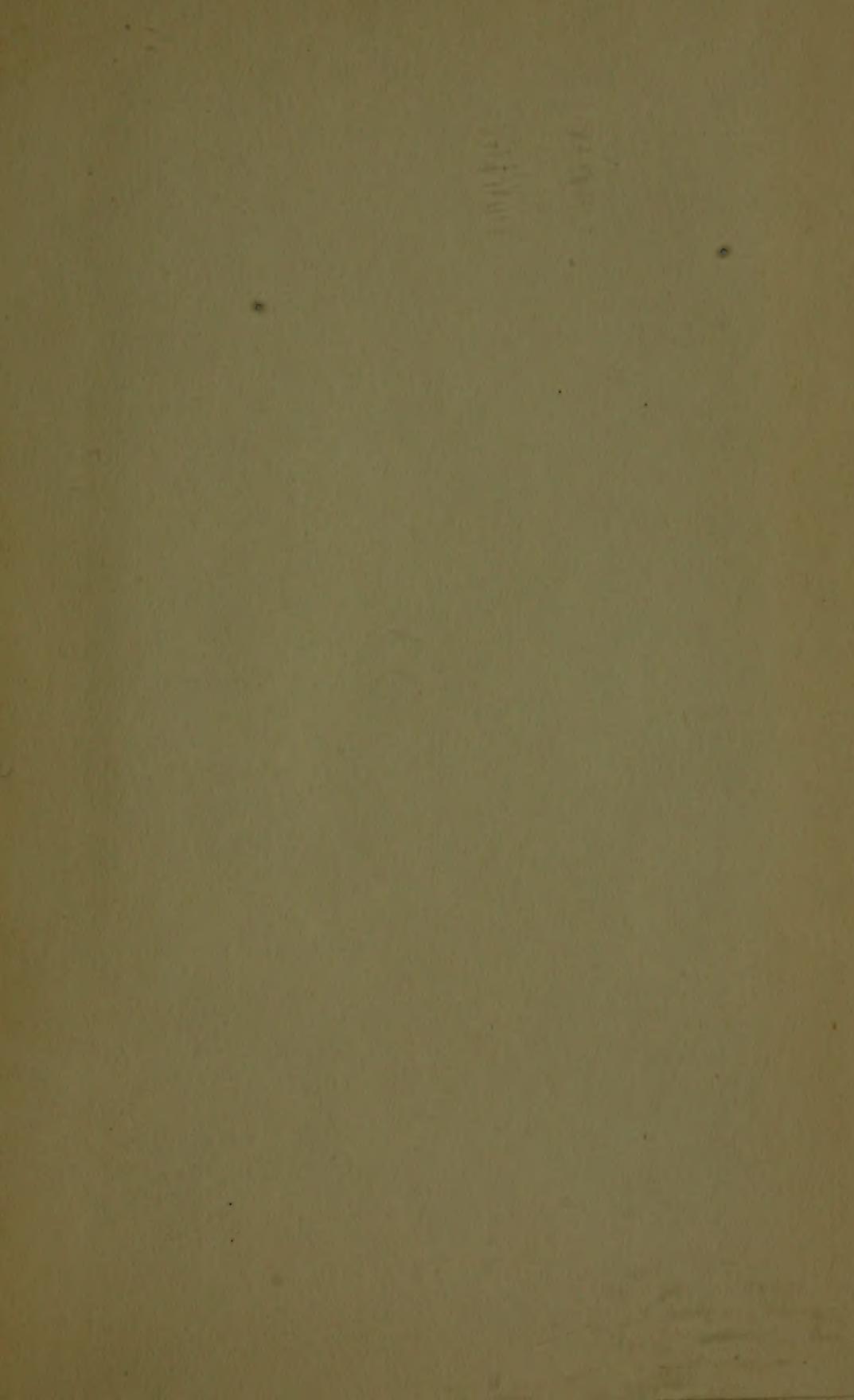
It is interesting to notice that the heaviest rainfall occurs on the high ground formed by the Chalk ; the low ground, which is largely covered with impermeable clay and warp, receives a comparatively light rainfall. The range of rainfall between the wettest and the driest parts of the Riding is about 10 inches.

The value of rainfall for water supply from underground sources depends to a great extent on the season at which it falls. In spring and summer a very large proportion of the rain is absorbed by vegetation or evaporates from the surface, and little or none percolates through even the most permeable subsoil ; but in late autumn and winter evaporation is reduced and vegetation is largely dormant, so that a large amount of the rainfall is free to percolate, and the underground stores are replenished.

The heaviest monthly fall referred to was 7.81 in. at Warter, in September, 1871, the smallest 6.0 in., also at Warter, in February, 1891.

The wettest month is October, with 11.8 per cent., or nearly one-eighth of the year's rain. Next comes August with 10 per cent., a high value mainly due to the thunderstorms which are common in that month.

The month of least rainfall is April with 6.3 per cent. of the annual fall. On account of the low rainfall of January, February, and March, the half year, October-March, in which percolation is at a maximum, has scarcely more rain (51.8) per cent. than the half year, April-September, in which percolation is at a minimum (48.2 per cent.).



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